Ofcom
OFFICE OF COMMUNICATIONS

Partial Private Circuits Charge Control

Consultation document

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The deadline for comments is **30 July 2004**

Contents

Summary

S.1 This consultation document is published at the same time as Ofcom's Final Statement on the Review of the retail leased lines, symmetric broadband origination and wholesale trunk segments markets ("the LLMR Statement"). In the LLMR Statement Ofcom concludes that BT has Significant Market Power ("SMP") in the wholesale markets for low bandwidth (up to and including 8Mbit/s) and high bandwidth (above 8Mbit/s up to and including 155Mbit/s) traditional interface symmetric broadband origination (TISBO) in the UK (excluding the Hull area). These markets include leased lines services, and in particular Partial Private Circuits ("PPCs") terminating segments.

S.2 The LLMR Statement imposed on BT, amongst other SMP services conditions, Conditions G4 and GG4 which implement an interim charge control for PPC terminating segments services falling within the markets for low bandwidth and high bandwidth TISBO respectively. The interim PPC terminating segments charge control will remain in place until the proposals set out in this consultation document for a longer term PPC terminating segments charge control can be implemented. Ofcom expects the longer term PPC terminating segments charge control to be in place by 1 October 2004, subject to the results of this consultation.

S.3 Ofcom imposed an interim PPC terminating segments charge control in advance of the longer term control to ensure that the provision of PPC terminating segments would remain broadly cost orientated while a detailed analysis of BT's costs going forward could be separately completed. The proposals set out in this document for a longer term PPC terminating segments charge control reflect this analysis.

S.4 The proposed longer term PPC terminating segments charge control will give stability in the markets for PPC terminating segments and will encourage BT to reduce its costs of provision leading to the efficient supply of PPC terminating segments services. This will also promote competition in the downstream markets, particularly retail leased lines.

The present document

S.5 Ofcom is proposing to modify SMP services Conditions G4 and GG4 so as to control future prices for PPC terminating segments by means of an annual RPI-X% reduction. The formal Notification under the Communications Act 2003 ('the Act') recording Ofcom's specific proposals is at Annex D. Stakeholders may make representations within the period ending on 30 July 2004. Arrangements for making representations are at Section 7.

Summary of Proposals

Scope

S.6 Ofcom proposes that the scope of the longer term PPC terminating segments charge control is limited to the products and services related to the provision of PPC terminating segments in the low and high bandwidth markets for TISBO, where BT has been found to have SMP. Radio Base Station ("RBS") backhaul and Local Loop Unbundling ("LLU") backhaul products and services have not

been included within the scope of the longer term PPC terminating segments charge control because these relatively new services and products were not part of the interim charge control that was imposed as a result of the LLMR.

Duration

S.7 Ofcom proposes that the PPC terminating segments charge control be imposed for four years, as this will provide stability in the market and increase incentives on BT to achieve efficiency savings. This is in keeping with other charge controls that have been implemented in the telecommunications sector in the UK and Ofcom believes there are insufficient reasons for departing from the standard approach.

Form

S.8 Ofcom is proposing to use an RPI-X form of charge control. This form of charge control has been widely used in the regulation of UK utilities, including those in the telecommunications sector. The merits of using RPI-X for the regulation of BT's PPC terminating segment charges are discussed in full in Section 2 of this document.

Key Issues

S.9 Ofcom considered a number of key issues in relation to the setting of the values of X for the RPI-X charge control. These include:

- The construction of charge control baskets: Ofcom is proposing three separate baskets, one for PPC terminating segments equipment charges, one for low bandwidth PPC terminating segment connection and rental and maintenance charges and one for high bandwidth PPC terminating segment connection and rental and maintenance charges;
- The weighting of the charge control baskets: Ofcom is proposing using prior year revenue weights;
- The treatment of BT's equipment costs within the charge control: Ofcom is proposing to use BT’s equipment purchase contract to inform the proposed value of X;
- Geographic discounts: Ofcom is proposing to allow BT to offer geographic discounts but these will not contribute to BT meeting its charge control obligations; and
- Volume discounts: Ofcom is proposing to not allow BT to offer volume discounts.

S.10 Ofcom's proposals in respect of these key issues are discussed in detail in sections 4 and 5 of this document.

Efficiency Studies

S.11 The objective of the charge control is to bring BT’s charges into line with an efficient level of costs at the end of the charge control. As part of this process it is important to understand the extent of BT’s efficiency/ inefficiency at the outset of the charge control so that the erosion of existing inefficiency can be reflected in the value of X.

S.12 Oftel commissioned economic consultants NERA to carry out studies to examine the efficiency of BT's network relative to appropriate comparator companies, principally the US Local Exchange Carriers (LECs). These studies expand upon the comparative efficiency analysis which has previously been undertaken by NERA for Oftel in relation to other charge controls in place on BT.

S.13 NERA's conclusion is that BT is in the region of 9% to 10% inefficient in its provision of services over its network as a whole relative to the top performing decile of the US LECs. It is reasonable to expect inefficiency existing at the start of the charge control period to be eliminated over the life of the control, just as competitive pressure would force companies to become efficient in a competitive market. The underlying rate of cost reduction over the period of the charge control is therefore adjusted to reflect expected catch-up of current inefficiency. An executive summary of NERA's report is provided in Annex H. An explanation of how the conclusions of the efficiency study are incorporated into the calculation of the values of X is included in Annex E.

BT's cost of capital

S.14 The aim of the financial modelling exercise to calculate the values of X is to estimate pricing and charging constraints such that, by the end of the charge control period, BT is forecast to earn a level of return on the basket services that is equal to its weighted average cost of capital (WACC). As part of the current review Ofcom has updated its view on BT's cost of capital, last calculated by Oftel in February 2001, because the constituent parameters of BT's WACC tend to vary over time in line with changing equity and bond market conditions.

S.15 Overall, using a broad range of parameters, Ofcom estimates BT's pre-tax nominal cost of capital for BT to be approximately 12.5%. This is slightly lower than Oftel's February 2001 estimate of 13.5% due to, principally the use of:

- a lower risk free rate;
- a lower debt premium; and
- higher gearing levels

S.16 The reasoning behind the adoption of Ofcom's new parameter values is outlined in Annex G

Values of X

S.17 Ofcom has developed a cost forecasting model to calculate proposed values of X for the charge control. The underlying methodology of Ofcom's approach is consistent with that used in other charge controls applicable to BT. The forecasting model uses a variety of inputs and data sources to calculate the values of X. Further details of Ofcom's approach are included in Section 4 and an explanation of Ofcom's forecasting model is included in Annex E.

Proposed values of X

S.18 Ofcom's cost forecasting model calculates the values of X to be applied to the low bandwidth and high bandwidth charge control baskets. The values of X for these baskets are sensitive to the inputs used for the parameters in the model.

Therefore, in this document Ofcom is consulting on a range for the values of X. Ofcom will consider the responses to this consultation and use these to inform its final view of the values of X for these charge control baskets. Ofcom's proposals for the value of X applicable to the equipment charges basket is informed by BT's equipment purchase contract which will last for a significant part of the proposed charge control period.

Ofcom's proposed values of X for the proposed charge control to 2008/09

Basket	Value of X[1]
POC end and third party end equipment charges	8.9%
Low bandwidth connection and rental and maintenance charges	1.25 to 5.0
High bandwidth connection and rental and maintenance charges	7.25 to 8.5

Level of charges at start of control

S.19 Ofcom is proposing that the longer term charge control will be applied to the current charges, reduced by RPI-7% to reflect reductions in costs since August 2003. That reduction is achieved through the interim charge control implemented by SMP Conditions G4 and GG4, which were set as a result of the LLMR.

S.20 BT has produced a model ("BT's model") to derive individual charges for each service covered by the proposed PPC terminating segments charge control. Use of the outputs derived directly from BT's model would result in significant increases in some charges and a change in the relative structure of prices. These outputs suggest a need for significant changes in the prices of BT's PPC terminating segment charges, with prices rising overall. However, Ofcom is currently unable to endorse BT's model or its outputs. In addition, scrutiny of BT's continued profitability in these markets does not provide compelling evidence of a need for increased prices. Therefore, Ofcom is not proposing to set starting charges for the longer term control. The charges resulting from the interim charge control set out in the LLMR will be the charges to which the charge control will be applicable.

Alternative BT proposals

S.21 Given that differences of view between Ofcom and BT concerning the level of costs relevant to charges for PPC terminating segments have not been resolved, Ofcom offered BT the opportunity to put forward an alternative set of PPC terminating segments charges which addressed the competition problems in these and related markets at least as well as Ofcom's proposals but reflected BT's own views of the costs. BT's proposals, which rebalance trunk and terminating segment charges within the context of a significant aggregate reduction over the 4 years of the proposed control, are set out in Chapter 6. Ofcom would also welcome views on these proposals.

[1] Values of X for the low bandwidth and high bandwidth charge control baskets are rounded down to the nearest quarter integer.

Section 1
Introduction

Historical regulation of PPCs

1.1. In December 2002, Director General of Telecommunications (Oftel) published the Phase 2 PPC Direction[2] which set the charges that BT could charge for the provision of PPC terminating segments. The Phase 2 PPC Direction set starting charges from 1 August 2001 based on BT's 2000/01 cost data.

The New Regulatory Framework

1.2. A new regulatory framework for electronic communications networks and services entered into force on 25 July 2003. The framework is designed to create harmonised regulation across Europe and is aimed at reducing entry barriers and fostering prospects for effective competition to the benefit of consumers. The basis for the new regulatory framework is five new EU Communications Directives[3]. Four of these Directives were implemented in the UK via the Communications Act (the "Act") on 25 July 2003. Ofcom's powers and duties in respect of the regulation of electronic communications are set out in the Act. The fifth Directive was implemented by Regulations which came into force on 11 December 2003.

1.3. The new Directives require national regulatory authorities ("NRAs"), such as Ofcom, to carry out reviews of competition in communications markets to ensure that regulation remains proportionate in the light of changing market conditions.

1.4. Prior to the assumption by Ofcom of its full range of powers and functions under the Act on 29 December 2003, certain preparatory work, including a number of market review consultations, was carried out by Oftel. Oftel ceased to exist on 29 December 2003, and all preparatory work carried out by Oftel under the Act and new Directives prior to this date now has effect as if done by Ofcom. This includes the Leased Lines Market Review (LLMR) consultation documents of 11 April 2003[4] and 18

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[2] "Partial Private Circuits: Phase two. A direction to resolve a dispute concerning the provision of partial private circuits." Oftel, 23 December 2002.

[3] Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (the "Framework Directive"); Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities (the "Access and Interconnection Directive");

Directive 2002/20/EC on the authorisation of electronic communications networks and services (the "Authorisation Directive"); Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services (the "Universal Service Directive"); and Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector (the "Privacy Directive").

[4] "Review of the retail leased lines, symmetric broadband origination and wholesale trunk segment markets, A consultation by the Director general of Communications", Oftel, 11 April 2003.

December 2003[5], prior to the issue of the LLMR Final Statement by Ofcom (which is being published in tandem with this document).

The Leased Lines Market Review

1.5. In the LLMR Ofcom assessed a number of markets and found that BT has SMP in, amongst others, the following product markets in the UK excluding the Hull area:

- low bandwidth traditional interface broadband origination; and
- high bandwidth traditional interface broadband origination.

Partial Private Circuits ("PPC") terminating segments are services within each of these markets

1.6. The LLMR consultation documents indicated that Oftel would, as part of its programme to implement the new EU Directives, implement a longer term PPC terminating segments charge control to regulate the price of PPC terminating segments, which are an important wholesale input into retail leased line markets.

1.7. Since assuming its full range of powers and functions under the Act in December 2003, Ofcom has continued the analysis of the leased lines market begun by Oftel. In the LLMR Statement Ofcom imposed, by way of SMP Services conditions G4 and GG4, an interim charge control on PPC terminating segments, to be in place until a longer term charge control could be implemented.

1.8. An interim PPC terminating segments charge control was imposed by the LLMR on the basis that a longer term charge control on PPC terminating segments should be the subject of a separate consultation. This is because the imposition of a longer term charge control necessitates a detailed analysis of the likely future changes in the costs of providing PPC terminating segments TISBO services. At the time of consulting on the findings of the LLMR, the required analysis had not been completed. Therefore Ofcom imposed an interim PPC terminating segments charge control in advance of the longer term control to ensure that the provision of PPC terminating segments would remain broadly cost orientated while that analysis was being undertaken. The conclusions of that analysis have informed Ofcom's proposals for a longer term PPC terminating segments charge control set out in this consultation document.

1.9. This document sets out the proposals for a modification of SMP services Conditions G4 and GG4. These modifications propose the control of future prices for PPC terminating segments by means of an annual RPI-X% reduction. Proposals for a value of X, the amount by which the PPC terminating segments charges would reduce each year throughout the duration of the charge control, are set out in Section D. Proposals for the implementation of the charge control, including the charges at the start of the control, are set out in section 5.

[5] http://www.ofcom.org.uk/consultations/past/llmr/llmr_review/?a=87101

Technical Background

1.10. A leased line is a connection between two customer premises providing a transmission link of a fixed bandwidth. The link is un-contended and provides dedicated capacity between the customer premises. A leased line can be used for voice, video and data communications between customer premises and enable access to the Internet. For instance leased lines can be used to connect an organisation's main offices to a central database to facilitate transactions, order handling and many other applications. There are a range of leased lines bandwidths to suit the requirements of retail customers, typically from 64kbit/s up to 1Gbit/s.

1.11. Leased lines are typically provided using copper or fibre and using a variety of transmission technologies. A Leased line can be provided by linking a pair of customer premises using dedicated copper or fibre or can be provided by using copper or fibre local ends that connect the end customer to a transmission network.

Figure 1.1: A Leased Line using a dedicated transmission medium

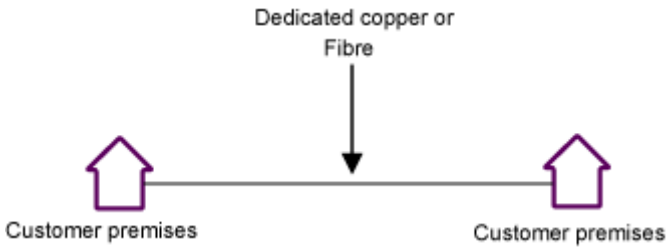
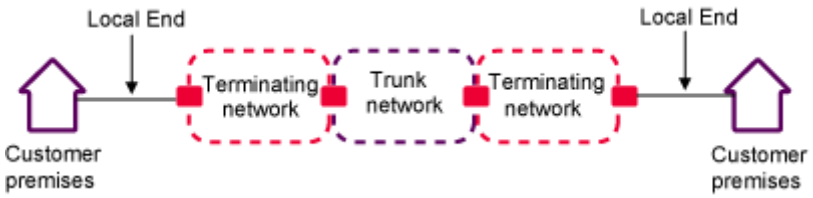


Figure 1.2: A Leased Line provided using a transmission network



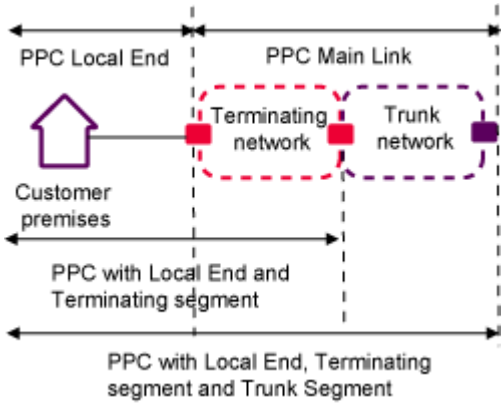
1.12. A leased line provided using dedicated fibre or copper is likely to be providing an Alternative Interface such as Ethernet whereas a leased line provided over a transmission network is likely to be providing a Traditional Interface such as Synchronous Digital Hierarchy ("SDH"), which is a network technology that enables transmission of various bandwidths of data to be combined and transmitted through fibre optic networks to enable complex leased lines and data communications services to be provided to customers.

Partial Private Circuits

1.13. A PPC is a part leased line providing a dedicated capacity connection from a customer premise to an operator's point of connection (POC) with BT's Leased Line SDH network. PPCs are available at all bandwidths from 64kbit/s to 622Mbit/s. PPCs are available only in traditional interface form.

1.14. Figure 1.3 below depicts three PPCs each having different components which are effectively dependent on the length of the PPC.

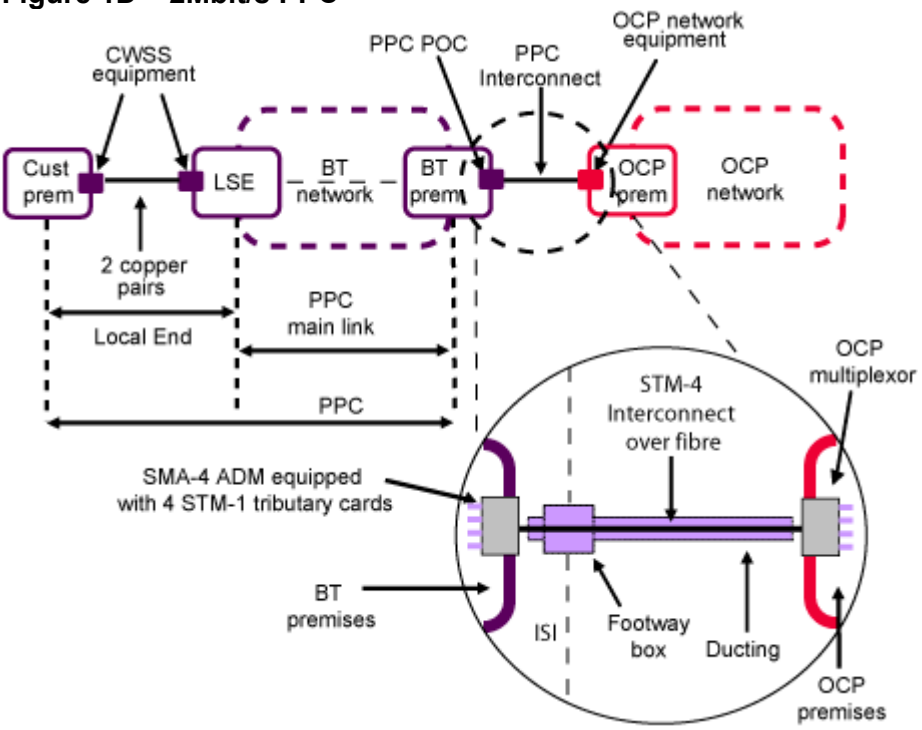
Figure 1.3: A Partial Private Circuit



1.15. A PPC will always have a terminating segment that includes a local end which is the dedicated link between the customer premise and the Local Serving Exchange (LSE) and is provided using copper pairs or fibre pairs. A PPC can also have a 'Main Link' which comprises dedicated transmission capacity between the Local Serving Exchange and the operator's Point of Connection with BT's network. This Main Link can have a mixture of Terminating network and Trunk network transmission usually called terminating and trunk segments. Ofcom's proposals set out in this consultation document relate only to PPC terminating segments.

1.16. Figure 1D below depicts a 2Mbit/s PPC in greater detail showing the Local End, Main Link and the Point of Connection (POC).

Figure 1D – 2Mbit/s PPC



The structure of PPC charges

1.17. Ofcom is not proposing to make changes to the current PPC terminating segments charging structure which was originally constructed through a commercially negotiated agreement between BT and industry. The various charge types are explained below.

Equipment and infrastructure charges

1.18. Where equipment and infrastructure was provided by BT to operators, the cost of the provision was to be recovered up-front. This included third party local end infrastructure and POC equipment and infrastructure. In the context of PPC terminating segments equipment and infrastructure include equipment, copper, fibre and duct. PPC terminating segments, when ordered, would have a connection charge and a rental charge in addition to the third party equipment and infrastructure connection charges. POC equipment and infrastructure has a connection charge and a rental charge.

PPC circuit connection charges

1.19. The circuit connection charge is the charge levied to recover the costs incurred by BT in provisioning the PPC terminating segments.

PPC circuit rental and maintenance charges

1.20. The circuit rental and maintenance charges are the charges levied by BT for the ongoing rental and maintenance of the PPC terminating segments. The PPC terminating segments rental has three main components; a Local End Fixed Charge, a Main Link Fixed Charge and a Main Link per kilometre Charge.

Local End Fixed Charge

1.21. This is a flat rate charge depending on the bandwidth of the Local End but the costs of the Local End are averaged for each bandwidth so this charge is independent of the type of Local End infrastructure deployed. For instance, a 2Mbit/s Local End can be provided over copper or fibre but the Local End fixed charge is the same for either type of Local End.

Main Link Fixed Charge

1.22. This is a flat rate charge for PPC terminating segments with a Main Link and has no distance related element but is dependant on the bandwidth of the PPC terminating segments.

Main Link per Kilometre Charge

1.23. This is a charge per kilometre for the Main Link and again this varies by bandwidth. Initially the commercially agreed pricing for the Main Link per Kilometre charge was cost oriented up to 15km with pricing freedom for longer Main Links.

Outline of rest of the document

1.24. The following Sections cover:

- Rationale for RPI- X form of control (Section 2)
- Proposals for charge control baskets (Section 3)
- Derivation of Values of X (Section 4)
- Implementation of charge control including the modification of the SMP condition (Section 5)
- Conclusions and Next Steps (Section 6)
- Details of the consultation process (Section 7)
- In addition Ofcom has provided Annexes on:
- Responding to the consultation (Annexs A - C)
- Notification of proposals to modify existing SMP conditions G4 and GG4 (Annex D)
- Ofcom's Forecasting Model (Annex E)
- Analysis of charges at the start of charge control (Annex F)
- BT's Cost of Capital (Annex G)
- NERA efficiency study summary (Annex H)
- Glossary (Annex I)

Section 2
Rationale for charge control

Imposing a longer term charge control

2.1 Ofcom considers that it is appropriate to impose a longer term PPC terminating segments charge control in the markets for low and high bandwidth traditional interface symmetric broadband origination, where BT has been found to hold SMP, in order to promote competition in the downstream markets, including retail leased lines. Ofcom considers that the promotion of competition in these markets through the imposition of the PPC terminating segments charge control will further the interests of consumers by resulting in cheaper prices at the retail level.

2.2 Regulation at the wholesale level is designed to address the problems which result from the existence of SMP in the relevant wholesale market. In particular it is designed to ensure that the SMP at the wholesale level does not restrict or distort competition in the relevant downstream markets or operate against the interests of consumers, for example through excessively high prices. The long term PPC terminating segments charge control, by preventing the fixing and maintaining of prices at an excessively high level in the wholesale markets for PPC terminating segments, will have the effect of encouraging BT to provide PPC terminating segments services at an efficient level as well as encouraging competition in retail leased lines.

2.3 Ofcom does not consider that the obligations for cost orientation imposed on BT by the LLMR in the low bandwidth and high bandwidth TISBO markets provide sufficient constraint on PPC terminating segment charges and that it is necessary to apply a charge control. Ofcom concluded in the LLMR that in the absence of charge controls, BT would have little incentive to reduce or constrain increases in its costs and hence in its PPC terminating segments prices.

2.4 By regulating BT's PPC terminating segments prices in the manner set out in this consultation document, Ofcom considers that a longer term charge control is appropriate for the purposes of promoting efficiency and sustainable competition by encouraging BT to be more efficient and enabling other communications providers to compete with BT at the retail level. This will result in the availability of a wider range of services at lower prices, thereby conferring the greatest possible benefits on the end users of public electronic communications services.

2.5 The longer term charge control will ensure that competing communications providers and ultimately retail customers will be protected from increasing wholesale charges and will provide incentives to improve efficiency.

Scope of charge control

2.6 The scope of the proposed longer term PPC terminating segments charge control is limited to the products and services which fall within the market for TISBO services, the prices of which were determined as part

of the Phase 2 Direction. The scope of the charge control will be narrower than the charges set in the Phase 2 Direction because that Direction also covered PPC terminating segments in the very high bandwidth market. However, the LLMR concluded that BT does not have SMP in the very high bandwidth TISBO market. Therefore no ex-ante regulatory controls may be imposed on BT in this market.

2.7 It is open to BT to introduce additional PPC terminating segment products at any time. However, any additional PPC terminating segment products would not be included within the scope of this charge control. Nevertheless, BT will be required to comply with its other ex-ante obligations in the relevant markets i.e. non-discrimination, cost orientation and meeting reasonable requests for supply, along with its obligations under general competition law.

RBS Backhaul and LLU backhaul

2.8 Ofcom is not proposing to include RBS backhaul and LLU backhaul products and services within the scope of the longer term PPC terminating segments charge control, even though in Ofcom's view these backhaul products and services are technically equivalent to the PPC terminating segments products and services subject to the control. These services were not subject to the PPC Phase 2 Direction and Ofcom considers that to extend the scope of this regulation at this time is unnecessary, given the requirement to supply these services on equivalent terms to PPC terminating segments. BT remains subject to its ex-ante obligations e.g. non-discrimination, cost orientation and meeting reasonable requests for supply along with its obligations under general competition law.

Form of control

2.9 Ofcom is proposing to apply a RPI-X form of control for a four year period. An RPI-X form of control requires that a weighted average of prices should not increase by more than inflation less a specified X factor. A RPI-X charge control has a number of key features. These include:

- baskets into which different products and services are grouped and to which different values of X can be applied; and
- a fixed duration over which the charge control is in place.

2.10 This form of control has been widely used in the regulation of UK utilities, including the telecommunications sector. It can be set over a number of years so as to reflect future efficient operating costs and an appropriate return to shareholders.

2.11 One of the main benefits of RPI-X type price regulation is that it creates incentives for firms to increase their efficiency. By divorcing for a period of time the level of charges from the firm's incurred costs, the regulated firm has an incentive to increase its cost efficiency over and above the increase forecast when the charge control is set, by reducing costs below those reflected within the charge cap i.e. unanticipated efficiency gains. The charge controlled firm benefits from this efficiency through increased profits for the duration of the charge control.

2.12 When setting the terms of the subsequent charge control, the gap between price and cost is closed by a glide path, rather than a one-off adjustment. Therefore, the firm holds on to the gain for some time into the subsequent charge control period. The unanticipated efficiency gains feed into a tighter charge control going forward. In this way the gains from increased cost efficiency are shared between the firm and consumers, so that consumers benefit in the longer term.

2.13 In reaching its proposals Ofcom considered whether other forms of charge control would be more appropriate for the regulation of BT's PPC terminating segment charges, such as rate of return regulation. Rate of return regulation involves setting the rate at which the regulated firm can make a return on its capital employed and it is this along with its operating costs that determines the charges that the firm can set. This form of regulation was popular in the regulation of utilities in the US and has the main advantage that there is unlikely to be any extreme profit or loss. However, this form of control involves out-turn costs being passed through to prices, so there is a significant incentive to over-invest in its regulated business as it is guaranteed to earn a return on its investment. Furthermore, there is little incentive on firms to achieve efficiency savings. Therefore, customers may not benefit in the longer term. There are additional disadvantages in this approach related to the specification of the appropriate rate of return and how the firm and customers should share any losses.

2.14 When setting the terms of the charge control it is important for Ofcom to recognise the potential consequences of setting the charge control too tightly. This could impact on the ability of LLU communications providers to build a sustainable business since TISBO is one of the markets that LLU communications providers might wish to enter; and the charge control may cause BT to price its PPC terminating segments below cost. This in turn could act as a disincentive (both to BT and to other communications providers) to invest in infrastructure.

Question 1: *Do respondents agree that an RPI-X control is the appropriate form of charge control for the regulation of PPC terminating segments*

Duration

2.15 Ofcom is intending to apply a four year RPI-X charge control on the products defined in the scope of the control. In the telecommunications sector in the UK, charge controls have generally been put in place for periods of four years, because this time period provides an appropriate balance between incentivising efficiency and forecasting certainty.

2.16 PPC terminating segments are a relatively new product which means that there is less information available about the costs of providing PPC terminating segments and about how demand at different bandwidths may change over time. However, applying a shorter duration charge control would reduce the time over which BT can outperform the control and increase profits. BT would have a shorter period over which to close the efficiency gap (discussed in the next section), which would dilute the incentive properties of the charge control. This could mean that BT's costs would not reduce to the same extent as they would if the charge

control is in place for four years. Therefore, the values of X in subsequent controls may be lower than they otherwise would have been resulting in competing communications providers (referred to hereafter as Altnets) and ultimately consumers, facing higher charges than they would have if a four year charge control had been implemented. In addition, if the duration of the charge control is too short, this would reduce the time between control reviews, increasing the regulatory burden.

2.17 If the duration of the control is too long, the probability that the actual costs will differ significantly from the forecast of costs used to formulate the value of X increases. This means that the prices charged will have diverged from the underlying costs introducing allocative inefficiencies. If the actual costs are below the forecast costs, the benefits of these lower costs will not be passed through to customers. On the other hand, if the actual costs are too high it may become difficult for the regulated firm to make a reasonable return on its regulated activities. This could create pressure to review the terms of the charge control before the end of the control period. Such uncertainty as to whether the terms of the charge control will be reviewed before the end of the control period will reduce the incentives to increase efficiency.

2.18 As discussed below, Ofcom has experienced considerable difficulty in establishing reliably the extent of the efficiently incurred costs of the relevant activities. BT has argued that costs are materially higher than assessed by Ofcom but has so far been unable to produce robust arguments in support of its position. It is however possible such robust arguments will emerge over the next few years. This would be an argument in favour of a shorter control period – say 2 years.

2.19 Ofcom has also considered the duration of the proposed charge control in the context of the next review of competition in the wholesale leased lines markets, which could happen within the next two years. At that time it may be appropriate to review Ofcom's conclusions about the relevant geographic markets and the extent of competition in the relevant markets. If Ofcom were to conclude that BT no longer has SMP in some markets as currently defined, or in parts of the current markets, then it would be inappropriate to continue the charge control in these markets or parts of markets.

Question 2: *Do respondents think that a four year charge control is the appropriate duration for the regulation of PPC terminating segments?*

Approach to equipment charges

2.20 BT's equipment costs are driven mainly by its equipment supply contract. BT's contract with its supplier includes a pricing schedule for all the PPC terminating segments equipment that is listed in the BT carrier price list and that is subject to the charge control.

2.21 BT's current contract with its supplier is due to expire before the end of the proposed period of the control. This means that Ofcom has been able to come to a reasonably accurate view of BT's PPC terminating segment equipment costs for a significant part but not all of the relevant period. Therefore Ofcom does not have PPC terminating equipment cost data

upon which it can base its view of cost changes over the whole of the period of the control.

2.22 Ofcom proposes to include BT's equipment within the RPI-X form of charge control. Whilst Ofcom recognises that there are disadvantages to this approach this is preferable to the alternatives of cost pass-through and/or of building into the charge control provisions an error correction mechanism, which are discussed below.

Cost pass-through

2.23 Cost pass-through would involve passing through the costs incurred by BT in purchasing PPC terminating equipment for use by BT's downstream activities and competing communications providers being passed through in their entirety to customers purchasing wholesale PPC terminating segments from BT. This approach would ensure that BT is able to recover all of the costs that it incurs through its equipment purchase contract. It would also ensure that any change in these costs resulting from a change in the terms of its equipment purchase contract would not adversely affect BT and that any improvement in the contract pricing terms would be passed through to purchasers and consumers within the timeframe of this charge control.

2.24 However, Ofcom is concerned that the incentive properties of such an approach may not be in the best interests of end consumers or of competition in the associated downstream markets. The main disadvantage of cost pass-through in this particular instance is that it may distort BT's incentives to minimise its costs. Cost pass-through would guarantee that BT would be able to recover in full all of its costs associated with PPC terminating segments equipment for the duration of this charge control. Therefore, this would weaken the incentive to increase efficiency in this area and may in fact introduce incentives whereby a higher cost may be a desirable outcome for BT.

2.25 Moreover, a cost pass-through mechanism can introduce a significant administrative burden in assessing compliance because this approach can involve an ex-post independent audit to assess compliance with the charge control conditions. It is also possible that a carry over provision would need to be included within the charge control.

RPI-X charge cap

2.26 As explained above, Ofcom believes that a RPI-X charge cap has a number of merits. These merits also apply to the application of RPI-X to BT's equipment charges. This mechanism creates incentives that are consistent with those present in a competitive market. However, it does involve increased risks for the charge controlled firm compared to a cost pass-through mechanism. In this particular instance, the risk on BT is related to the renegotiation of its equipment purchase contract. Under cost pass-through, BT would be guaranteed to recover all of its equipment costs. However, under a RPI-X mechanism, this guarantee is removed.

2.27 However, the incentive properties of RPI-X are improved compared to a cost pass-through mechanism. This is because BT will generate

additional profits if it is successful in negotiating a revised contract that results in lower equipment purchase costs. Therefore, BT should have an incentive to negotiate in a way that ensures that its equipment costs are minimised over the period of its subsequent equipment purchase contract. However, if BT is unable to successfully negotiate a lower cost contract, BT's customers will be protected from price increases by the RPI-X formula.

2.28 If BT is successful in negotiating a contract with more favourable pricing to BT than assumed by Ofcom in determining its charge control proposals for equipment costs, although BT will not be required within the framework of the charge control to pass through these cost reductions to its wholesale customers, customers will benefit in the longer term. If a further charge control was formulated beyond October 2008, and BT had a lower cost equipment purchase contract, it is likely that this would be used as the basis for setting the value of X applicable to equipment costs for that charge control. Under this scenario, BT's wholesale customers would then benefit from the lower costs that BT would incur during part of the proposed control period.

Error correction mechanism

2.29 Error correction mechanisms involve correcting, within the duration of the charge control, for any significant errors within the charge control forecast. This approach would generally be used where the path of cost movements over the duration of the charge control is subject to significant uncertainty, due to exogenous factors, at the time of setting the control. The incentive properties of such a mechanism are weaker than a pure RPI-X approach to price regulation, and are rarely adopted within the UK regulatory framework. An error correction mechanism tends to shift the risk of forecast error onto consumers rather than the operator. This could be of concern if the consumers are less well placed to bear these risks. Moreover, an error correction mechanism may undermine one of the key features of a RPI-X form of charge control, i.e. the control remains unaltered for the duration of the charge control. In addition an error correction mechanism in this instance could create perverse incentives when BT comes to negotiate a revised PPC terminating segments equipment purchasing contract. This is because BT may try to increase the prices it faces if it means that it can trigger the error correction mechanism. This potential effect could be mitigated by not allowing BT to pass-through the full increase in the prices that it faces.

Conclusion

2.30 There is a high degree of certainty as to how BT's equipment costs will change over a significant period of the charge control given the terms of BT's agreement with its equipment supplier. Moreover, it is Ofcom's view that equipment costs will continue to fall after the expiry of that agreement because equipment used to provide equivalent functionality in the future should, on the basis of well-established trends, be no more expensive (and probably cheaper) than the equipment currently used to provide such functionality. Whilst Ofcom does not know to what extent these costs will fall, Ofcom believes that it is reasonable to set a value of X for the equipment basket based on the information available from BT's current equipment contract. Moreover, this will introduce incentives on BT

(to the extent that they do not already exist) to minimise its equipment costs on prevailing equipment purchase contracts. Any reduction in cost in excess of that used in the formulation of the value of X will be of benefit to BT within the timescale of this charge control since BT's charges (and hence revenue) are not linked directly to its costs. However, the benefits will flow to BT's wholesale customers during the subsequent charge control period.

2.31 The RPI-X form of control in this instance minimises the creation of perverse incentives on BT that may accrue from either a cost pass-through regime or from an error correction mechanism.

Question 3: *Do respondents agree with Ofcom's proposals for the treatment of equipment costs within the charge control?*

Section 3

Construction of Baskets for charge control

Introduction

3.1 In the previous section, Ofcom set out its proposals to implement an RPI-X form of charge control across the relevant group of PPC terminating segments products and services identified, for a period of four years. An RPI-X form of control requires that a weighted average of prices should not increase by more than inflation less a specified X factor.

3.2 A charge control basket is the term used to describe a group of products and services that are subject to the same charge control restrictions. To determine appropriate charge control baskets it is necessary to consider whether there is a greater degree of competitive pressures for one set of products or services compared to another, and where there is a differentiation of competitive pressures, it is inappropriate to group these products and services in the same basket. To do so could create opportunities and incentives for BT to charge in a way that has an anti-competitive effect. Therefore the regulated products and services are disaggregated until there are a minimum number of baskets given the competitive characteristics of the products and services being regulated.

Proposals for charge control baskets & weightings

3.3 Ofcom proposes that each of the different categories of PPC terminating segments charges are separated into three baskets. There will be one basket each for:

- point of connection (POC) equipment and infrastructure charges and third party equipment and infrastructure charges;
- low bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges; and
- high bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges.

3.4 Ofcom is proposing to calculate the value of X and to assess BT's compliance with the PPC terminating segments charge control on the basis of prior year revenue weights. This is consistent with the other charge controls applicable to BT.

Approach to basket construction

3.5 Ofcom has considered whether the regulated PPC terminating segments products and services are subject to substantially different degrees of competition. The LLMR defines separate wholesale traditional interface symmetric broadband origination markets on a bandwidth basis, with separate markets for:

- wholesale low bandwidth TISBO (up to and including 8Mbit/s);

- wholesale high bandwidth TISBO (above 8Mbit/s up to and including 155Mbit/s); and
- wholesale very high bandwidth TISBO (above 155Mbit/s).

3.6 The market analysis set out in the LLMR concludes that BT is dominant in both the wholesale low bandwidth and the wholesale high bandwidth markets, but not the very high bandwidth market. The conclusions of the LLMR suggest that there should be separate baskets for each of the two markets where BT is identified as having SMP.

3.7 This approach allows BT the flexibility to respond to demand changes and recover those common costs reflected within the charge control in an efficient way, without creating incentives for it to price anti-competitively. Constructing more baskets than are appropriate given the competitive conditions in the markets being regulated, would reduce the flexibility available to BT to set its prices for its products and services in an efficient manner. This flexibility may be important when reacting to competitive pressures and achieving efficient outcomes.

Equipment and infrastructure costs

3.8 Ofcom has considered combining non-bandwidth specific equipment and infrastructure costs within the basket for low bandwidth connection and rental and maintenance charges, because there is uncertainly around BT's equipment costs beyond the expiry of its current agreement, and the equipment costs associated with the low bandwidth basket are significantly greater than the costs associated with the high bandwidth basket. Incorporating equipment costs into the low bandwidth basket would have minimised the probability that the non-bandwidth specific equipment costs would unduly influence the value of X for that basket.

3.9 However, BT was unable to provide Ofcom with an estimate of the total costs of circuits and the total costs of equipment on a comparable basis in order to determine the appropriate weights of equipment costs and low bandwidth connection and rental and maintenance costs within the charge control basket. Therefore Ofcom is unable to include the costs associated with equipment within the low bandwidth basket. Because of this Ofcom is proposing a separate charge control basket for equipment charges. This is appropriate because it will ensure that BT reduces its equipment charges in line with the reductions in costs that are expected during the period of BT's current agreement, while creating incentives for BT to lower its equipment costs beyond this period.

Question 4: *Do respondents agree with Ofcom's proposals for the following three separate charge control baskets:*

- *point of connection (POC) equipment and infrastructure charges and third party equipment and infrastructure charges;*
- *connection of a new PPC terminating segments charges and rental and maintenance charges for low bandwidth circuits; and*
- *connection of a new PPC terminating segments charges and rental and maintenance charges for high bandwidth circuits.*

Approach to basket weightings

3.10 The charge control basket weightings are used in the calculation of the value of X and to calculate whether BT has complied with the obligations set out within the terms of the charge control i.e. that it has reduced the prices of its PPC terminating segments products within the baskets by appropriate amounts. Ofcom is proposing to calculate the value of X and to assess BT's compliance with the PPC terminating segments charge control on the basis of prior year revenue weights. This is consistent with the other charge controls applicable to BT.

3.11 Ofcom has considered whether to use prior year or current year revenues or volumes. In the other charge controls imposed on BT by Oftel as a result of the narrowband market reviews, the practice has been to set basket weights equal to the proportions of basket revenues accruing to the relevant services in the year prior to that in which the price change occurs, i.e. prior year weighting. This is as opposed to using current year basket revenues as a proportion of total current year revenues i.e. current year weighting. Prior year weighting was preferred to current year weighting in these previous controls as the latter requires forecasts of weights to be made, with the consequent need for retrospective adjustment for forecast errors. This approach has generally been supported by respondents to previous Oftel consultations on charge controls.

3.12 However, there may be good reason to switch from baskets calculated on the basis of prior year weightings to baskets calculated on the basis of current year weightings. This is mainly due to the relative newness of PPC terminating segments products and the fact that prior year revenues or volumes may not accurately reflect revenues or volumes in the year in which BT's compliance with the control is being assessed.

3.13 If revenues or volumes are erratic, either upwards or downwards between one year and the next, then in a regulatory environment where compliance with the charge control is determined by prior year weights, BT may have scope to "game" the compliance rules to its advantage. It is generally the case that there is an incentive to match price increases to those products and services whose weight is increasing and vice versa. One set of products and services may have a high weighting on a prior year basis, whereas if the weighting were calculated on the basis of current year, the outcome of the compliance calculation may differ. BT may, within its pricing decision, have scope to affect the weightings of the products and services within the basket in such a way as to make compliance with the cap less onerous. The proposed structure of the control, with separate baskets for high bandwidth and low bandwidth charges reduces this risk.

3.14 It is Ofcom's view, despite the potential drawbacks related to the potential for revenues to be erratic year on year, that it is appropriate to use prior year revenue weights to calculate the value of X and whether BT has complied with the obligations set out within the terms of the charge control. This approach avoids the need to forecast weights and retrospective correction of errors.

Question 5: *Do respondents agree with Ofcom's proposals to weight the charge control baskets according to prior year revenues?*

Section 4

Deriving Values for X

Introduction

4.1 The intention behind reducing the regulated charges by RPI-X in each year of the charge control is for the weighted average charge of the products and services within the charge control basket to equal the forecast of the efficient level of costs at the end of the charge control period. In formulating proposals for the charge control, it is necessary to forecast how relevant costs could be expected to change over the period of the charge control. Ofcom has developed a forecasting model to derive the value of X to be applied to the charge control baskets, the construction of which is described in Annex E. The values of X from the forecasting model represent a forecast of how BT's costs of providing the products and services within each of the charge control baskets will change over time, including an allowance for any efficiency gap that may exist at the outset of the charge control.

4.2 Ofcom's approach to forecasting BT's costs over the period of the charge control and the methodology used to generate ranges for the values of X for the charge control is explained in this section. Ofcom has included at Annex E analysis demonstrating the extent to which using different input values for parameters in the cost forecast model affects the values of X.

Proposals for the values of X

4.3 Ofcom is consulting on ranges for the values of X for the low bandwidth and high bandwidth charge control baskets. This is because the values of X for these baskets are sensitive to the inputs used for the parameters in the model. Ofcom will consider the responses to this consultation, in particular in relation to the input values for each of the parameters in the model, and use these to inform its final view of the values of X for these charge control baskets. Ofcom's proposals for the value of X applicable to the equipment charges basket is informed by BT's equipment purchase contract. Ofcom's proposals (and ranges where appropriate) for the values of X for each of the proposed charge control baskets are set out in table 4.1 below.

Table 4.1 – Ofcom's view of the values of X for the proposed charge control to 2008/09

Basket	Value of X
POC end and third party end equipment and infrastructure charges	8.9%
Low bandwidth connection and rental and maintenance charges	1.25 % to 5.0%
High bandwidth connection and rental and maintenance charges	7.25 to 8.5%

The level of X for the charge control on BT's equipment charges

4.4 Ofcom intends to use BT's PPC terminating segments equipment purchase contract with its supplier (discussed at paragraph 2.20 above)

to inform Ofcom's view of how the costs will change over the period of the control. BT's equipment purchase contract reduces BT's PPC terminating segments equipment prices by a specified amount per annum in nominal terms. Therefore, in order to calculate the value of X, it is necessary to add on to this price change an allowance for inflation (in order to calculate the required real terms reduction). There are two broad approaches to including this allowance for inflation. One is to use the actual inflation rate in each year in which the control is in effect. A second is to use an average of the actual level of inflation over the period in which BT's equipment purchase contract has already been in place. Ofcom believes that the second approach is preferable. This is because this approach will ensure that the charge control on equipment charges will be the same as that which has effectively been achievable since BT's equipment purchase contract has been in effect. The second approach results in an RPI-8.9% charge cap.

Question 6: *Do respondents agree with Ofcom's proposals for the value of X applicable to the proposed equipment cost basket?*

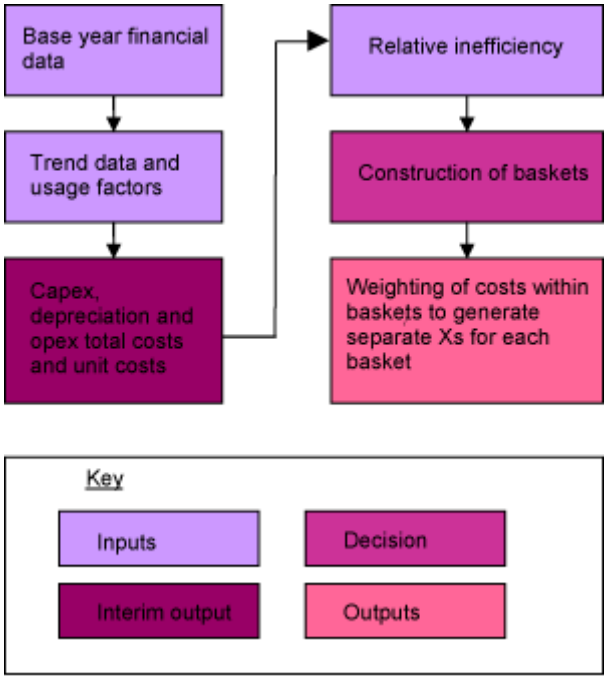
The level of X for the charge control on connection, rental and maintenance charges

4.5 As set out above, Ofcom proposes two further charge control baskets in addition to a basket for equipment charges: one for low bandwidth connection and rental and maintenance charges, and one for high bandwidth connection and rental and maintenance charges. The level of X for these remaining two baskets is determined using a PPC terminating segments cost forecasting model which is described below.

Approach to forecasting model

4.6 The PPC terminating segments cost forecasting model is based on a methodology consistent with that used by Oftel in developing its proposals for the current charge controls that operate in other markets. Figure 4.1 shows a flow diagram of the high level inter-relationships within the forecasting model.

Figure 4.1 – Flow diagram of Ofcom's cost forecasting model



4.7 The inputs into the model consist of base year accounting data from BT's regulatory costing systems as well as a number of assumptions for the parameters of the model, a parameter being variable within the model which when alternative values are used, results in different values of X. The main input parameters of the model are:

- volume changes (separately for "BT to BT" and "BT to Altnets");
- asset price changes;
- asset volume elasticities (AVEs) and cost volume elasticities (CVEs); and
- BT's relative inefficiency.

4.8 BT has provided Ofcom with its view of each of the model parameters. Where forecast data is required, BT has provided its view up to 2006/07. Where forecast data is required beyond 2006/07, it has been necessary for Ofcom to develop its own view of how these parameters will change, if at all, beyond the period for which BT has provided data.

4.9 Ofcom has analysed the data provided by BT to support its view of the input parameters of the model. In forming a view on the appropriate input values, Ofcom has used information available to it from work carried out on other charge controls, as well as work related to the leased lines markets and information provided by Altnets.

Summary of proposed adjustments to BT's view on input parameters

4.10 Ofcom has considered BT's view on the input parameters for the model and believes that it is appropriate to make a number of adjustments as summarised in the table 4.2 below for the reasons discussed in the following paragraphs.

4.11 The effect of these adjustments on the range of values for X is presented in Annex E.

Table 4.2 – Ofcom's adjustment to input parameters to the PPC terminating segments cost forecasting model

Parameter	Adjustment
Volume changes	Range of values with BT's view adjusted by different degrees with the view at one end of the range which reflects no decline in low bandwidth volumes Extrapolation of forecast view from 2006/07 to 2008/09 assuming less aggressive growth in high bandwidth volumes in these last two years
Asset price changes	Based on actual values for 2001/02 and 2002/03
Asset volume elasticities and cost volume elasticities	Values consistent with those used in determining the value of X for other current charge controls
BT's relative inefficiency	Range of values between 5% and 10%

Volume changes

4.12 The values of X for the charge control are sensitive to the volume assumptions due to the interaction between volumes and the asset volume elasticities and cost volume elasticities, which reflect economies of scale and are explained at paragraphs 4.21-4.25 below.

4.13 The volume changes parameter represents the annual change in the number of circuits ordered at different bandwidths. BT has provided base year data and forecast data for the volume of circuits that it sells to Altnets; those that it sells to mobile operators and those sold internally to BT. BT has forecast that PPC terminating segments sold to Altnets will increase over the relevant period while those sold to BT will decrease. BT has suggested that low bandwidth volumes are decreasing for a variety of reasons. BT's reasons for decreasing volumes include external factors, such as companies ceasing to exist and rationalisation of costs; as well as the impact of PPC terminating segments and other new BT products targeted at BT's private circuit product group on the existing base and new demand for retail leased lines.

4.14 BT is forecasting a shift of volumes from BT to BT circuits, to BT to Altnet circuits; and, a shift from low bandwidth circuits to high bandwidth circuits. In aggregate terms, volumes in the low bandwidth market are predicted to decrease over the period of the control, while volumes of high bandwidth circuits are predicted to increase. Data provided by Altnets for the market as a whole generally supported this view, although due to information constraints, Altnets unable to disaggregate this data into BT to BT and BT to Altnet volumes. Nevertheless, the data provided by the Altnets generally predicted that while low bandwidth volumes would decrease, the rate of reduction was less than that predicted by BT.

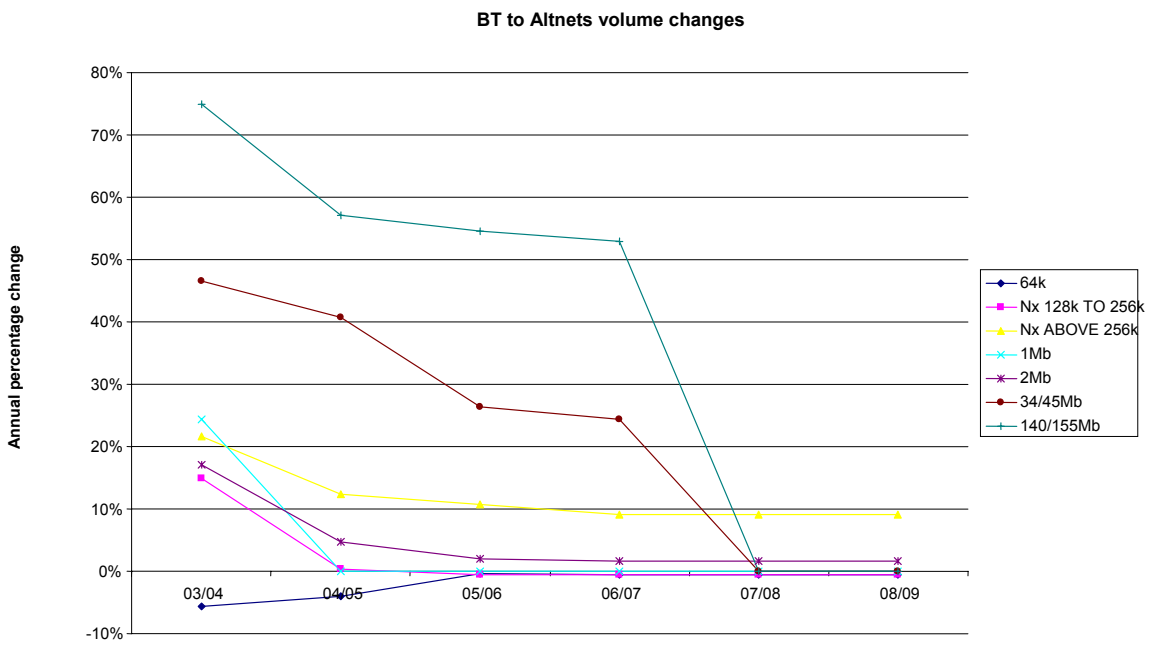
4.15 In Ofcom's view a market where retail prices are declining (which should follow reductions in wholesale charges) does not necessarily lead to a

decrease in the volumes of low bandwidth PPC terminating segments circuits as price falls tend to stimulate increases in market volumes. However, BT is predicting some very large reductions in low bandwidth volumes and the value of X is rather sensitive to these assumptions. Therefore, in determining a range for the value of X for the low bandwidth basket, it is Ofcom's view that it is necessary to amend these volume projections. Ofcom has used BT's forecasts to inform Ofcom's calculation of the value of X for the low bandwidth basket. To calculate the lower bound of the range Ofcom has reduced BT's forecast of the rate of volume declines for low bandwidth BT to BT circuits. To calculate the other end of the range Ofcom has modified BT's forecasts for low bandwidth BT to BT volumes to indicate zero volume growth, or constant volumes over the period of the charge control.

4.16 To inform Ofcom's volume change forecasts to 2008/09, Ofcom has extrapolated the volume forecasts by the rate of change in 2006/07. The exception to this is for the high bandwidth BT to Altnet volumes, which BT has forecast rapid volume growth in the years to 2006/07. It is Ofcom's view that such a rate of volume growth is unlikely to be maintained beyond 2006/07. Therefore, Ofcom proposes to assume constant volumes in 2007/08 and 2008/09 for both 34/45Mbit/s circuits and 140/155Mbit/s circuits, perhaps a rather cautious assumption in this case.

4.17 Ofcom's view of the likely percentage volume changes for BT to Altnet volumes is shown in figure 4.2 below.

Figure 4.2: Annual percentage change in BT to Altnet volumes by bandwidth



4.18 Ofcom's view of the likely range of percentage volume changes for BT to BT volumes is shown in figures 4.3 and 4.4 below

Figure 4.3: Annual percentage change in BT to BT volumes by bandwidth - lower bound

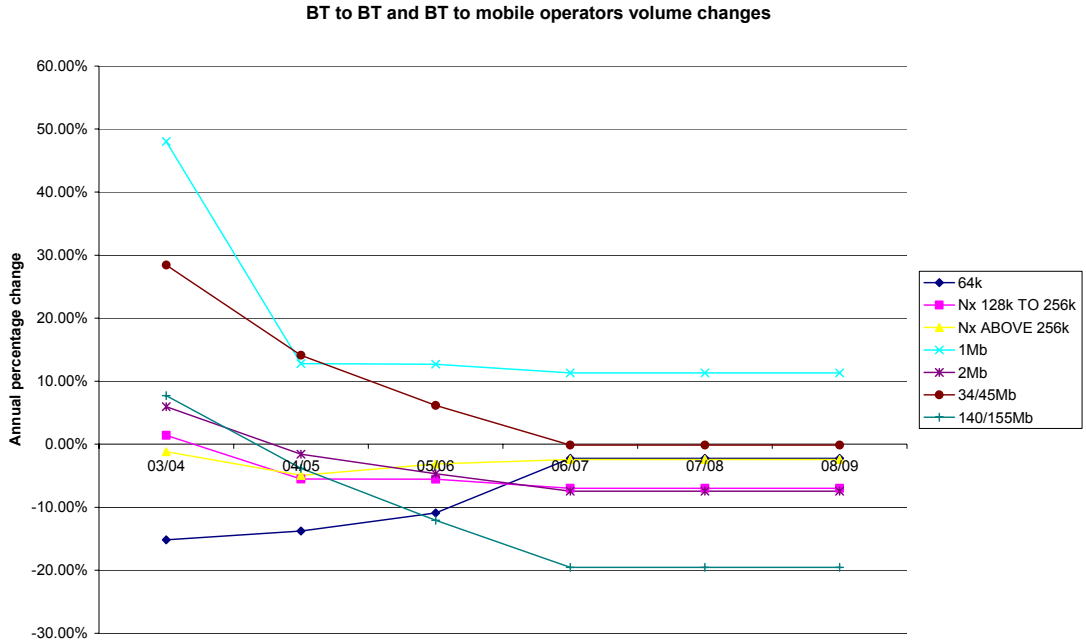
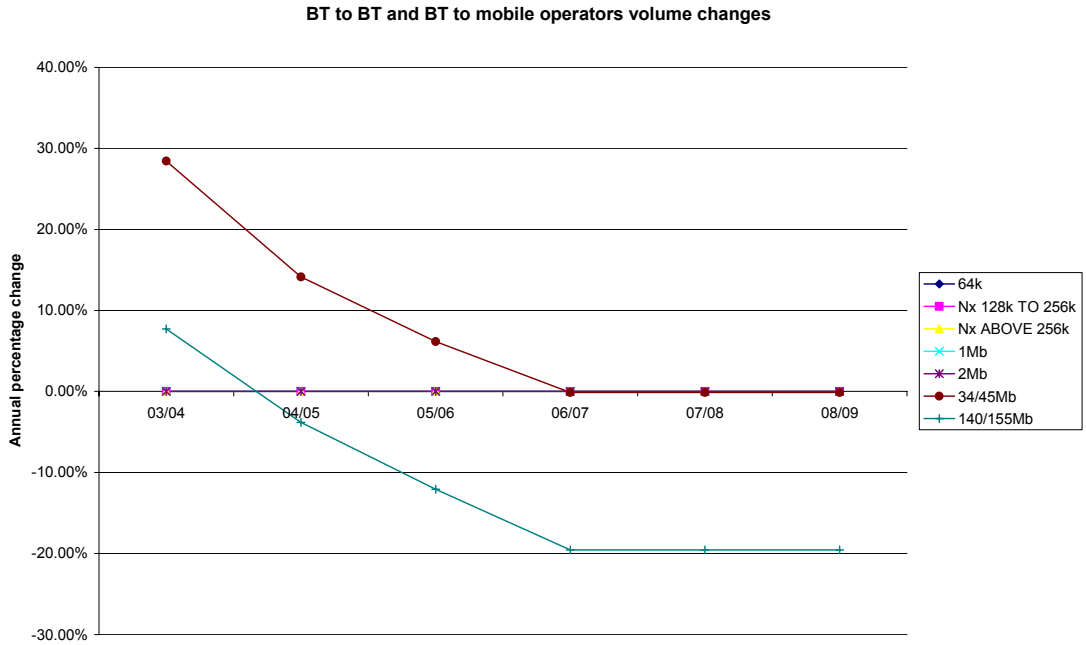


Figure 4.4: Annual percentage change in BT to BT volumes by bandwidth – upper bound



Asset price changes

4.19 There are ten asset types[6] relevant to the provision of PPC terminating segments (taken from BT's Regulatory Financial Statements). The asset price change parameter is the amount by which each of the asset types changes in price, year on year. BT has provided forecast data which

[6] These are: cable, duct, local exchange, main exchange, transmission, other network equipment, motor transport, land & buildings, computers & OM and other.

exhibit asset price rises for the period up to 2006/07. This is despite recent years' actual data showing asset prices falling. This data also contrasts with that used in the formulation of the values of X in other charge controls in other markets. The asset price change data at that time generally showed significant anticipated reductions in asset prices. BT has provided commentary to Ofcom to justify its view that there will be an increase in asset prices over the period of this charge control. This includes BT being subject to premium pricing due to lack of commercial availability of some assets. However, in Ofcom's view, lack of commercial availability is likely to reflect new more efficient methods of providing equivalent functionality and therefore asset prices should not increase over the period of the charge control. This is with the exception of land and buildings and motor transport for which the asset prices may be expected to increase. There could also be an argument for cable and duct asset prices to increase as this includes capitalised labour.

4.20 Ofcom proposes to use the average of BT's historical asset price changes for 2001/02 and 2002/03 as the basis for future asset price changes from 2003/04 in deriving values of X. The asset price changes used in the model for each year from 2003/04 onwards are set out in table 4.3.

Table 4.3: Asset price changes for each year from 2003/04 to 2008/09 based on the average of BT's historical values for 2001/02 and 2002/03

	Average of 2001/02 and 2002/03 values
Cable	-0.6%
Duct	-0.3%
Local Exchange	0.9%
Main Exchange	0.2%
Transmission	0.0%
Other Network Equipment	-1.2%
Motor Transport	4.7%
Land & Buildings	0.8%
Computers & OM	0.0%
Other	-1.9%

Asset volume elasticities and cost volume elasticities

4.21 Asset volume elasticities (AVEs) and cost volume elasticities (CVEs) measure the percentage increase in costs for a 1% increase in volume. A cost to volume elasticity of close to 1 would imply that economies of scale are largely absent and that real unit costs, and hence the value of X, would be unaffected by volume growth rates. A cost to volume elasticity of close to zero would imply that economies of scale are significant and that every percentage increase in volume growth rates would have a significant effect on the value of X.

4.22 AVEs reflect the extent to which the gross replacement cost (GRC) for the ten individual asset types relevant to the provision of PPC terminating segments changes in relation to volumes. Similarly, CVEs reflect the extent to which operating costs change with a change in volumes. CVEs are split into two categories, labour and non-labour.

4.23 BT has provided estimates of its AVEs and CVEs by measuring the LRIC to FAC ratio for each asset type and operating cost category. However, Ofcom does not agree that this is the appropriate methodology because LRIC:FAC ratios are conceptually different from AVEs and CVEs. The LRIC of a product or service may include any fixed costs incurred in its provision, while the AVE relates to the cost changes at the margin.

4.24 Ofcom notes that the LRIC:FAC ratio of some asset types is in excess of 0.75. This compares to the average AVE used in setting other current charge controls of 0.31, which apply in markets where the asset types are common with those used in the provision of PPC terminating segments. BT at that time proposed an average AVE value of 0.29. Ofcom has no reason to believe that BT's AVEs and CVEs will have changed to the extent implied by BT's data provided for this charge control. Therefore, Ofcom proposes to use the AVEs and CVEs used in other charge controls, which are shown in the table below.

4.25 BT's estimate of AVEs and CVEs are constant over time. This is consistent with Ofcom's approach in other charge controls currently applying to BT.

Table 4.4: Asset volume elasticities and cost volume elasticities used in the model

Asset category	Values
Cable	0.20
Duct	0.05
Local Exchange	0.55
Main Exchange	0.70
Transmission	0.65
Other Network Equipment	0.65
Motor Transport	0.40
Land & Buildings	0.20
Computers & OM	0.74
Other	0.65
Cost category	
Non-pay	0.24
Pay	0.24

Question 7: *Do respondents agree with Ofcom's proposed adjustments to BT's view of the following input parameters?*

- *volume changes;*
- *asset price changes; and*
- *asset volume elasticities and cost volume elasticities.*

BT's relative inefficiency

4.26 One of the main benefits of an RPI-X form of charge control is that it creates incentives on the charge controlled firm to increase its efficiency, over the period in which the charge control is in force. The objective of the charge control is to bring the charge controlled firm's charges into line with an efficient level of costs at the end of the charge control period. As part of this process it is important to understand the extent of BT's efficiency/ inefficiency at the outset of the charge control so that erosion

of inefficiency can be reflected in the value of X. It is reasonable to expect inefficiency existing at the start of the charge control to be eliminated over the life of the control, just as competitive pressures would force companies to become efficient in a competitive market.

4.27 The output of the forecasting model, represented by the value of X, reflects the extent to which the regulated firm can increase its efficiency, when the starting charges are equivalent to costs. The value of X is derived in part by forecasting the level of efficiently incurred costs and how these change over the period of the charge control as explained in detail in annex E.

4.28 Ofcom has employed the consultancy NERA to undertake a comparative efficiency study to examine the efficiency of BT's network relative to appropriate comparator companies, principally the US Local Exchange Carriers (LECs). A summary of the conclusions of this report are set out in annex H and a copy of the full report is available on Ofcom's Website. The US LECs were chosen as comparators because a significant amount of detailed cost data is available for these operators and because better performing LECs are likely to provide areasonable benchmark for efficiency. NERA's conclusion is that BT is in the region of 9% to 10% inefficient in its provision of services over its network as a whole relative to the top performing decile of the US LECs. Ofcom has taken into account the conclusions of the efficiency study in calculating values of X for the charge control. This is achieved by using a glide-path to adjust the target level of costs in 2008/09 by an amount corresponding to the efficiency gap. This means that BT has the duration of the charge control to improve its efficiency and to close the efficiency gap implied by the conclusions of NERA's study. Further explanation of how the conclusions of the efficiency study are incorporated into the calculation of the values of X is included in Annex E.

4.29 BT was provided with a copy of NERA's draft final report and access to the underlying analysis, and had an opportunity to provide detailed comments. These comments were taken into account in the final report. Although BT has not explicitly stated its view to NERA of its relative inefficiency, NERA's interpretation of its comments on the interim report is that BT views itself to be 1% inefficient in relation to the US LECs. However, as can be seen from NERA's report, NERA disagrees that BT's alternative model specification is the most appropriate way in which to assess BT's relative inefficiency. Whilst NERA acknowledges that BT's alternative model specification does have merits, NERA believes that other model specifications are a better indication of BT's relative inefficiency.

4.30 Ofcom has considered the details of NERA's report and BT's reasons for believing that it is more efficient than implied by the report. In order to reflect BT's claims that the report overstates its relative inefficiency, in formulating ranges for the values of X for the PPC terminating segments charge control, Ofcom proposes to use a measure of inefficiency in the range between 5% and 10%.

Question 8: *Do respondents agree with Ofcom's proposed inefficiency adjustment to BT's data?*

SDSL & the charge control

4.31 Traditional HDSL technology is now widely being replaced by SDSL as a means of delivering low bandwidth leased line terminating segments over copper. This is an evolutionary process; several variants of HDSL have been implemented over the last decade in order to improve the bandwidth and reach of the technology. The current standard is generally known as G.SHDSL, and was ratified by the ITU in February 2001.

4.32 G.SHDSL is used by BT and by LLU operators to provide leased line terminating segments. The principal advantage of G.SHDSL in the current context is that it reduces the number of copper pairs required to deliver an E1 (2MBit/s) circuit. It has several other advantages, including improved spectral compatibility with ADSL.

4.33 A PPC terminating segment based on G.SHDSL is likely to be a lower cost alternative to one based on traditional HDSL technologies because of the reduction in copper costs. However, this cost reduction will not apply to all low bandwidth terminating segments, for the following reasons:

- the maximum bandwidth that can be delivered using G.SHDSL is 2.3 MBit/s. This is sufficient to deliver an E1 circuit, once overheads are taken into consideration, but not sufficient for all low bandwidth terminating segments.
- range limitations mean that it will not always be possible to deliver an E1 circuit using G.SHDSL. The maximum range over which the full bandwidth can be delivered is about 4km, though lower bandwidths can be delivered over longer ranges.
- it is unlikely to be cost effective to migrate existing PPC terminating segments from HDSL to G.SHDSL.

4.34 Given this increasing utilisation of SDSL technologies in the provision of low bandwidth leased lines, Ofcom has considered the extent to which this development should be reflected in its proposals for the PPC terminating segments charge control.

4.35 One approach to making an adjustment to the values of X for the proposed charge control to reflect the increasing use of SDSL would require Ofcom to identify the limitations of the extent to which SDSL could be used to provision PPC terminating segments and to predict the mix of new PPC terminating segments between HDSL and SDSL provided PPC terminating segments. This is not feasible with any accuracy, so Ofcom is proposing to not make an explicit adjustment to the values of X in this way.

4.36 In principle, an alternative approach is to calculate the values of X on the basis that all PPC terminating segments suitable for SDSL are provisioned using G.SHDSL. This would involve revaluing the PPC terminating segments asset base. It would also mean that the rate of depreciation of these assets would need to be accelerated. Without undertaking this significant project of work, it is not possible to predict what the magnitude of this change in approach would be for Ofcom's PPC terminating segments charge control proposals. However, it is likely

that the PPC terminating segment starting charges would have to increase to take account of the change in profile of cost recovery, while the value of X is also likely to increase.

4.37 The values of X proposed for the charge control reflect the extent to which SDSL is included within the cost information provided by BT to Ofcom to formulate the charge control proposals. As the proposed charge control applies to HDSL and SDSL delivered PPC terminating segments, the charge control as proposed will ensure that BT has the incentive to deploy the most suitable low cost technology when provisioning PPC terminating segments.

Question 9: *Do respondents agree with Ofcom's treatment of SDSL within the proposed charge control?*

Section 5
Implementation of Charge Control

5.1 This Section discusses the following issues relating to the implementation of the proposed charge control:

- what are the charges used to begin the control
- the scope for geographic discounts under the control
- the scope for volume discounts under the control
- the compliance regime envisaged for the control
- the modification to current SMP conditions.

Starting charges for the Charge Control

5.2 In this consultation document Ofcom sets out its proposals for the introduction of a longer term charge control for PPC terminating segment charges. As Ofcom is proposing to introduce such a control, it has also considered whether it is necessary to stipulate the level of starting charges for the charge control. Ofcom's view is that the longer term charge control in the first year should apply to the relevant revenues in the 12 months from 1 October 2003 to 30 September 2004. While BT has argued strongly that the charges that will be in place over this period (after implementation of the interim charge control set out in the LLMR Final Statement) are not cost reflective and in particular result in an under recovery of the efficiently incurred costs, Ofcom considers that there is insufficient evidence at present for it to accept that view.

Assessing whether there is an under recovery of costs

5.3 BT has provided Ofcom with its latest view of the appropriate charges for PPC terminating sements in the form of a pricing model ("BT's Pricing Model"). This model includes the latest audited financial information for 2002/03. Ofcom has undertaken a review of the BT Pricing Model.

5.4 The charges derived from BT's Pricing Model, if accurate, suggest that BT is significantly under recovering its costs for the provision of PPC terminating segments and that there is a need for significant rebalancing of individual PPC terminating segment charges. Annex F sets out a comparison of the Model outputs and current charges.

5.5 If the outputs of BT's Pricing Model were a reliable estimate of the costs of providing PPC terminating segments this would suggest that the control should not be simply started from current charges but that some adjustment should be made to the charge control to reflect the under recovery. In order to assess whether this is the case Ofcom has conducted a detailed review of the model and reviewed the available profitability information for PPC terminating segments services. The conclusions of that review are that:

- the BT Pricing Model and underlying cost inputs are not sufficiently reliable to demonstrate that the current charges result in an under recovery of efficiently incurred cost; and

- the additional profitability information provided suggests that BT in total does not appear to be under recovering costs for PPC terminating segments services.

Annex F sets out the financial analysis behind these conclusions.

5.6 Accordingly, Ofcom does not consider that good grounds exist for believing there is a material under recovery of costs for the provision of PPC terminating segments. Ofcom therefore proposes that current charges reduced by RPI-7% to reflect reductions in costs since August 2003 (as implemented by the interim charge control imposed by the LLMR) should be used as the starting charges for the charge control proposed to start on 1 October 2004.

Scope for geographic discounts

5.7 The LLMR Final Statement concludes that while the retail markets for leased lines and the wholesale market for traditional interface symmetric broadband origination (PPC terminating segments) are national, underlying costs and competitive conditions are not homogenous throughout the UK. In such circumstances, geographically differentiated averaged prices could be an indication of BT responding legitimately to cost differences in the face of competition. However, Ofcom notes that in responding to competition, BT has a duty to ensure that it continues to comply with its ex-ante and its general competition law obligations.

5.8 Given this approach, it is Ofcom's view that BT should, within the context of the PPC terminating segments charge control, be allowed to set differential charges between different geographic areas. This will allow BT the freedom to charge in a way that more accurately reflects the costs incurred and to respond to the local characteristics of competition that exists in these markets. Moreover, given the scale of cost differences that may exist and the extent of competition in some areas, BT's ability to compete could be limited if it were required to maintain nationally uniform prices.

5.9 However, it is Ofcom's view that in setting geographically differentiated charges, any price reduction below that mandated by the proposed charge control in any particular area should not contribute towards BT's charge control obligations. This approach ensures that BT will not be able to charge above the level proposed by the charge control in instances where competitive pressures are particularly weak.

5.10 It is Ofcom's view that this approach to remedies in the symmetric broadband origination market does not undermine its conclusion on the geographic definition of this market as set out in the Statement on the LLMR. However, Ofcom recognises that if BT chooses to widely geographically de-average its PPC terminating segments charges then this may have implications for geographic market definitions in future reviews of these markets.

5.11 In calculating the values of X for the charge control baskets, Ofcom has based its volume forecasts on an assumption that BT does not offer geographically differentiated charges. Thus it is implicit that BT loses share more rapidly in relatively low cost areas and this tends to increase

average circuit costs. However, If BT were to offer geographically differentiated charges this may alter the mix of the circuits that it is selling, i.e. assuming that BT offers discounts in areas where costs are lower and/or competition is greater, the proportion of circuits being sold in these areas will increase relative to the volume forecasts used to calculate the values of X. This would mean that the actual average cost of provision of all circuits would be lower than implied by the mix of circuits used to generate the forecast of volumes. In this respect and given that any discounts would be offered voluntarily, any geographic discounting by BT of its PPC terminating segments could be self-financing and it would not be necessary for BT to increase its charges in other higher cost, lower competition areas.

Question 10: *Do respondents agree with Ofcom's proposals for the treatment of geographic discounts within the charge control framework?*

Scope for volume discounts under the control

5.12 Volume discounts are a feature of the retail leased lines markets where BT (and to a lesser extent other operators) offer significant discounts on retail leased lines, the size of these discounts being related to the volume of circuits purchased. Volume discounts could cause concern to Ofcom due to the potential for such discounts to have a detrimental effect on competition. This is because BT's scale gives it an advantage such that not all other operators can match the volume discounts on offer from BT.

5.13 However, what is of concern within this charge control is the ability of BT to offer volume discounts in the provision of PPC terminating segments. BT will be selling these terminating segments to its competitors, in the shape of Altnets, and to itself, in the shape of BT's downstream activities. By far, currently BT's largest customer for PPC terminating segments is BT's downstream arm. BT forecasts this to be the case for the duration of the charge control. This raises the concern that if volume discounts are allowed within the charge control framework, these could be used by BT to justify it price discriminating in favour of its downstream arm as any discount will be related to volume. Depending on the structure of any discount scheme, this may mean that only BT's downstream arm can qualify for the lower priced wholesale products.

5.14 If BT is able to source wholesale inputs at a lower cost than its competitors in the retail markets, such an outcome has real potential to be detrimental to the development of competition in the retail leased lines market. One of the main motivations for the introduction of PPC terminating segments was to provide a wholesale product that would encourage the fostering of a more competitive retail market. It is Ofcom's view that if BT were permitted, within the charge control framework to offer volume related discounts that this could be detrimental to the development of competition in related downstream markets. Therefore, Ofcom intends to not allow BT to offer volume related discounts on its PPC terminating segments.

Question 11: *Do respondents agree with Ofcom's proposals for the treatment of volume discounts within the charge control framework?*

Monitoring compliance with the charge control

Services in baskets

5.15 BT's freedom to set charges for the services controlled by the three charge control baskets will be constrained so that the average charge in each basket cannot be increased by more than RPI less the relevant value of 'X' set out in the proposed modifications to Conditions G4 and GG4 (if RPI > the value of 'X'), or must be reduced by at least the value of 'X'-RPI (if RPI < the value of 'X'). RPI (i.e. the controlling value of RPI) is the term used to represent the percentage change in the Retail Prices Index in the 12 months up to June preceding the start of the relevant charge control year (the Relevant Year). With the exception of the equipment charges basket, compliance with this constraint will be monitored by calculating a 'weighted' average change in charges for each basket, where the weight for each service is BT's revenue for that service in the previous financial year as a proportion of basket revenue. The 'weighted' average for each basket is then compared with its respective value of RPI less the value of 'X'. The weights will include revenues from all sales of PPC terminating segments ie external sales to Altnets and internal sales within BT. For the equipment charges basket, the value of 'X' applies to the charge for each individual piece of equipment in this basket. Therefore these must all change by the same percentage.

Geographic discounts

5.16 BT is permitted to offer geographic discounts within the charge control framework. However, where BT offers geographic discounts, these discounts will not contribute towards BT meeting its charge control obligations. As such, for any PPC terminating segment products or services that fall within the scope of this charge control that are sold at a discount by BT on the basis of geographic location, BT is required to report the revenues from such products and services on the basis that no discount was offered. This applies both for calculating compliance with the charge cap in the relevant charge control year and for calculating the weights for each of products and services in the basket i.e. BT's revenue for that product and service in the relevant prior year. The mechanisms by which the revenues for charge control purposes are calculated are set out in the proposed modifications to Conditions G4 and GG4.

Provision for carryover

5.17 If BT's average charge for a basket at the end of the Relevant Year is lower than required by the associated RPI less the value of 'X' constraint, it will be able to carryover the difference into the next charge control year. That is, the benchmark for assessing BT's compliance with the control in the following year will be the level of charges BT was required to achieve, rather than the level it actually achieved. Conversely, if its average charge is higher than the required level, it has to take the excess into account in the following year.

Notice period for changes to charges

5.18 The LLMR Final Statement imposed requirements on BT relating to the notification period for changes to any charges for services provided by BT

within the markets in which it was found to have SMP. Conditions G6 and GG6 require BT to provide ninety days' notice of a change to a charge or the structure of the charge. This requirement remains in place in respect of high and low bandwidth TISBO services irrespective of the proposals set out in this consultation document.

Duration

5.19 The charge control is proposed to last for four years.

Accounting Separation and Financial Reporting

5.20 BT is required to prepare and publish financial information for PPC terminating segments. BT has to publish financial information to enable: a) the industry to view actual long run incremental, current and stand alone costs and charges for interconnection services and the components making up these services; and b) to provide transparency in the calculation of charges so that other market players are in a position to ascertain that these charges have been fairly and properly calculated. The financial information also helps to enable Ofcom to make determinations on specific charges or in assessing whether BT has breached competition rules. This information is contained in the Financial Statements, Accounting Documents and supporting methodology documents available on BT's website (www.groupbt.com/corporate/index.htm).

5.21 Ofcom is proposing that current charges reduced by RPI-7% to reflect reductions in costs since August 2003 should be used as the starting charges for the charge control proposed to start on 1 October 2004. BT has the freedom within each individual basket to set charges subject to a cost-orientation obligation for each individual service.

5.22 Ofcom would interpret cost orientation of an individual service as being based on its long run incremental costs plus an appropriate mark up for common costs. In particular any individual price would be expected to typically fall between its long run incremental cost and its standalone cost ceiling.

5.23 Where it has been deemed appropriate BT will be subject to regulatory reporting requirements in respect of each service within all wholesale markets in which BT has been found to have SMP[7].

5.24 As a result of its review of BT's Pricing Model Ofcom is aware that BT's current set of PPC terminating segments network components and associated volume measures are not readily capable of transparently and reliably demonstrating either the cost orientation of individual PPC terminating segments services or that services have been supplied to Altnets in accordance with the requirement not to unduly discriminate.

[7] The latest proposals for BT's regulatory financial reporting across all markets in which such obligations have been imposed is set out in:"The regulatory financial reporting obligations on BT and Kingston Communications in markets where SMP has been demonstrated Accounting separation and cost accounting: Final notification and explanatory statement published 8 April 2004. http://www.ofcom.org.uk/consultations/current/financial_rep/?a=87101

5.25 Furthermore the costs for certain PPC terminating segments elements, notably for third party customer link and point of handover equipment connection charges, are currently reflected by BT in the regulatory financial statements on an accruals accounting basis. The revenues however are recognised fully in the profit and loss in the year of sale. This accounting treatment means that the current Standard Service Statements, which compare the costs and revenues for individual services, for certain PPC terminating segments services are not prepared on a comparable basis.

5.26 Ofcom is also aware that BT's existing list of network components may not be sufficiently granular to adequately demonstrate non-discrimination both in terms of the costing of network elements (both PPC terminating segments and non-PPC terminating segments alike) between each other and between the services sold to Altnets and those supplied to BT's downstream retail activities. As a result Ofcom is setting up a workstream within its regulatory financial information project to review and update the list of network components. This revised set of network components will be subject to public consultation before Ofcom finally directs BT to enact it within it regulatory financial statements.

Modification of existing SMP Conditions

5.27 Section 87(1) of the Act provides that, where Ofcom has made a determination that a person is dominant in a particular market, it must set such SMP services conditions as it considers appropriate and as are authorised in the Act. This implements Article 8 of the Access and Interconnection Directive.

5.28 The Act (sections 45-50 and 87-92) sets out the obligations that Ofcom can impose if it finds that any undertaking has SMP. In particular, Ofcom can impose charge controls and rules in relation to cost recovery and cost orientation (section 87(9)). As discussed above, the LLMR Final Statement imposed SMP services condition G4 and GG4 on BT implementing an interim charge control for PPC terminating segments in the low and high bandwidth TISBO markets.

5.29 Section 86 prevents Ofcom from modifying a SMP services condition outside of a market review unless it is satisfied that there has been no material change in the markets identified since the market power determination was made.

5.30 The proposals in this document for the longer term PPC terminating segments charge control cover wholesale low and high bandwidth traditional interface broadband origination. As these proposals are published in conjunction with the LLMR Final Statement which makes these market power determinations, Ofcom is satisfied that there has been no material change in the relevant markets.

5.31 The proposed modifications are attached to the Notification at Annex D. The Notification itself is given under sections 48 and 86 of the Act and sets out Ofcom's proposals for the modification of SMP services conditions G4 and GG4 in respect of the low and high bandwidth TISBO markets identified in the LLMR. The proposed modifications to current SMP services condition G4 are set out in Schedule 1 to the Notification

and modifications to proposed new SMP services condition GG4 is set out at Schedule 2.

5.32 The proposed modifications implement the key proposals put forward in the document as follows.

5.33 First, Ofcom proposes the construction of a charge control for PPC terminating segments which has 3 baskets: low bandwidth connection and rental and maintenance charges; high bandwidth connection and rental and maintenance charges; and POC end and third party end equipment charges. SMP conditions G4 and GG4 currently apply in the low and high bandwidth markets respectively. The proposed modifications to these conditions therefore follow this 'market by market' structure. That is, SMP condition G4 sets the charge control for connection, rental and maintenance services for low bandwidth PPC terminating segments; and SMP condition GG4 sets the charge control for connection, rental and maintenance services for high bandwidth PPC terminating segments. The baskets for each set of services are set out at paragraphs G4.1(a) and GG4.1(a) of each condition respectively, with the formula to be used in calculating the revenues received from such services set out at paragraphs G4.2 and GG4.2 respectively. The relevant services for each market are listed in Annex A to each condition.

5.34 Second, while the category of 'POC end and third party end equipment charges' is referred to as a 'basket', Ofcom is proposing that each equipment charge be individually subject to a charge control. This contrasts to Ofcom's proposed treatment of connection, rental and maintenance charges, where BT will be entitled to aggregate the revenues for each of the services in complying with the relevant control. These proposals result in the need for different formulae to apply in calculating the relevant Percentage Change in charges in each year, as reflected in the different formulae in paragraphs G4.2 and G4.3; and GG4.2 and GG4.3 respectively.

5.35 Third, some of the equipment used in the provision of PPC terminating segments services in both the low and high bandwidth markets is non-bandwidth specific. That is, the same equipment can equally be used for the provision of services in either market. Because the SMP conditions to be modified apply on a market by market basis, Ofcom is proposing to impose identical controls (RPI-8.9%) on the relevant equipment in both markets (at paragraphs G4.5(b) and GG4.5(b) respectively). This has the effect of requiring the relevant equipment charges to comply with the price control irrespective of which market the equipment is used in.

5.36 Fourth, Ofcom is proposing that an RPI-X charge control be applied to each of the connection, rental and maintenance services baskets, with the value of X falling within the following ranges:

- for the low bandwidth charges: 1.25 to 5.0, and
- for the high bandwidth charges: 7.25 to 8.5.

5.37 This is set out in paragraphs G4.5(a) and GG4.5(a) of the proposed modifications to the conditions.

5.38 Fifth, it is proposed that the charge control will commence on 1 October 2004 and end on 30 September 2008. This is reflected in the definition of 'Relevant Year' set out at paragraphs G4.11 and GG4.11 in each of the proposed modifications.

5.39 Sixth, Ofcom is proposing, in the limited circumstances discussed at paragraph 5.12-5.14 above, that BT be allowed to apply geographic discounts to the charges for PPC terminating segments services and equipment in each of the relevant markets. However, Ofcom is further proposing that the application of any such discounts should not be able to be used by BT to its advantage in demonstrating its compliance with the relevant charge control. Therefore Ofcom is proposing that any such discounts be specifically taken into account by using the formulae set out in paragraphs G4.3 and GG4.3 in the event that any geographic discounts apply.

5.40 Additional points to note about the proposed modifications to SMP services conditions G4 and GG4 are:

- the charge control provisions are explicitly without prejudice to the general cost orientation obligations which are already in place as a result of the LLMR (current conditions G3 and GG3). This means that, irrespective of the charge controls, BT is still subject to cost orientation obligations in charging for PPC terminating segments;
- in interpreting the condition, the definitions that apply for the purposes of the current SMP services conditions set by the LLMR Final Statement should be referred to, except where specific definitions apply by virtue of paragraphs G4.11 and GG4.11; and
- paragraphs G4.6, G4.7, G4.8, GG4.6, GG4.7 and GG4.8 have been included so as to allow Ofcom to calculate BT's compliance with the charge in the Relevant Year, and also to allow some flexibility to the operation of the charge control in terms of carryover, as discussed at paragraph 5.17 above.

Communications Act tests

5.41 Section 3 of the Act imposes general duties on Ofcom, in carrying out its functions, to further the interests of citizens in relation to communications matters and of consumers in relevant markets, where appropriate by promoting competition. Ofcom considers that its proposed remedies fulfil these general duties under section 3 of the Act, having regard to the outcome expected to be achieved by its proposals, namely that charges for wholesale services are set at a level that enable communications providers to compete downstream. Section 3 also sets out certain matters to which Ofcom must have regard in performing its general duties. In considering which remedies to impose, Ofcom has had regard to these matters, in particular to the matters in section 3(4) and 3(5) of the Act, including the desirability of promoting competition in relevant markets, and the interests of consumers in respect of choice, price, quality of service and value for money, as set out below.

5.42 Section 4 of the Act sets out the Community requirements on Ofcom which flow from Article 8 of the Framework Directive. In considering which, if any, SMP services conditions to propose, Ofcom has taken

account of all of these requirements. In particular, Ofcom has considered the requirement to promote competition and to secure efficient and sustainable competition for the benefit of consumers.

5.43 Ofcom has carried out a full regulatory option appraisal in relation to the implementation of a charge control for PPC terminating segments as required by section 7 of the Act. This was set out in the LLMR consultation documents published in April 2003 and in December 2003.

5.44 As well as being appropriate (see section 87(1)), any proposed amendment to an SMP condition must also satisfy the tests set out in section 47 of the Act, namely that the proposed amendment must be:

- an SMP condition must also satisfy the tests set out in section 47 of the Act, namely that the proposed amendment must be:
- objectively justifiable in relation to the networks, services or facilities to which it relates;
- not such as to discriminate unduly against particular persons or a particular description of persons;
- proportionate as to what the condition is intended to achieve; and
- in relation to what it is intended to achieve, transparent.

5.45 The proposed condition is objectively justifiable in that it imposes an RPI-X charge control which will provide an effective mechanism to reduce prices in circumstances where competition cannot be expected to do so.

5.46 A longer term charge control will not discriminate against a particular person or particular persons because any communications networks, services or associated facilities can request PPC terminating segments from BT. However, while BT will be subject to charge control obligations and Kingston Communications will not, Ofcom does not consider this to be unduly discriminatory. This is because formulating a charge control for Kingston would be disproportionate due to the relatively low number of leased lines in the Hull area. Kingston is in any case subject to a cost orientation obligation and a non-discrimination obligation, and will be required to meet all reasonable requests for access.

5.47 Modification of the relevant SMP condition to impose a longer term charge control is considered proportionate because the charge control will impose a glide path requiring BT to reduce its charges for PPC terminating segments that will encourage BT to make cost savings over a four year period, in a market where Ofcom considers BT is likely to hold significant market power over the period of the control. Moreover, the reduction in charges required of BT over the period of the control has been formulated using information on BT's costs and a consideration of how these costs will change over time. In addition, Ofcom has also used the conclusions of a study carried out by NERA into BT's relative inefficiency to determine the magnitude of the required cost reductions.

5.48 Ofcom has included within the charge control structure relatively broad baskets. This will allow BT to recover common costs efficiently. The charge control also allows BT to offer geographically de-averaged charges, although any discounts offered by BT will not count towards meeting its charge control obligations. This balances the need to allow

BT to react to any developments in competition that may arise in a localised area with the need to protect customers where BT faces no competitive pressures. Overall, Ofcom considers that its proposals for the PPC terminating segments charge control are proportionate and strike an appropriate balance.

5.49 Ofcom has set out its analysis and a proposal for the longer term charge control in this consultation document, and attached the proposed modifications to Condition G 4 and GG4 at Annex D, and therefore considers that it has met the requirement of transparency set out in section 47 of the Act.

5.50 Section 88 imposes additional requirements for any proposals to set or modify SMP conditions which impose charge controls. The LLMR Final Statement has set out why Ofcom considers that the imposition of a charge control for PPC terminating segments meets these requirements.

5.51 In proposing the modifications to SMP conditions G4 and GG4, Ofcom is therefore satisfied that it has considered all of the relevant requirements of the Act.

Obligation to inform the Commission, other National Regulatory Authorities and the Secretary of State

5.52 Pursuant to section 50 of the Act, the Notification specifying the proposed modifications has been sent to the European Commission, other NRAs and the Secretary of State.

Section 6

Conclusion & Next Steps

Ofcom's Proposals

6.1 This consultation document has set out Ofcom's proposals for the implementation of the long term charge control for PPC terminating segments in October 2004.

6.2 In summary for the reasons set out in the consultation document Ofcom proposes:

- to start a control from current charges (i.e. today's charges subject to the interim adjustment proposed by the LLMR)
- to establish 3 baskets
  - point of connection (POC) equipment charges and third party equipment charges;
  - low bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges; and
  - high bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges.
- to set the percentage by which charges must fall in each year of the 4 year control within the following ranges:
  - low bandwidth: RPI -1.25% to -5%
  - high bandwidth: RPI – 7.25 to -8.5%
  - equipment charges: RPI – 8.9%

6.3 These proposals relate to PPC terminating segments. As explained in the LLMR, Ofcom is not currently minded to impose a charge control for trunk segment charges. However, these will continue to be covered by a cost-orientation obligation.

BT's Proposals

6.4 Notwithstanding that BT has been unable to convince Ofcom so far that the BT Pricing Model produces robust outputs for costs and charges, it continues to believe that this does provide the best basis for the charge control for terminating segments. Significantly on that basis the current charges for PPC terminating segments result in a significant under recovery of costs.

6.5 Accordingly, BT has proposed an alternative basis of charging which would lead to PPC terminating segment charges which were more closely aligned with the outputs of its model by the end of the control period. If this alternative were to be accepted, BT is prepared to enter into a formal commitment to a voluntary price cap on trunk segment charges. The aggregate effect, taking trunk and terminating segments together, is beneficial to purchasers of PPCs, in BT's view.

6.6 In full, BT proposals are as follows:

(i) For PPC terminating segments:

- BT to apply the interim adjustment of RPI-7% to current charges (set from 1 Aug 02), backdated to 1 Aug 03, to derive the starting charges for the charge control commencing on 1 October 2004.
- From 1 October 2004 Local end fixed charges for 34/45mb/s and 140/155mbs circuits would be reduced further by 8% and 53% respectively in line with BT's most recent cost information.
- For the period from 1 October 2005 to 30 September 2008, an annual adjustment of RPI-0.5% for PPC terminating segments

(ii) For PPC trunk segment charges:

- For low bandwidth circuits successive annual adjustments from 1 October 2004 of RPI-22.5%, RPI – 12.5%, RPI – 7.5%, RPI – 5.5%
- For high bandwidth circuits from 1 October 2004 annual reductions of RPI-8%

6.7 Ofcom has estimated the effect of BT's proposals to be as follows. Over the period of the control (1 October 2004 to 30 September 2008), terminating segment charges would fall by approximately 4% in real terms while trunk segment charges would fall by around 40%. In aggregate, this would lead to a reduction on PPC charges (including terminating segment and trunk charges) of approximately 25%. This compares with Ofcom's own proposals which would lead to a corresponding fall in terminating segment charges of between 8% and 20% over the period of the proposed charge control, depending on the final values of X.

6.8 It should be noted that these are only estimations of the aggregate impact on PPC charges, and are expressed in real terms. The impact on individual Altnets would vary depending on the types and quantity of circuits they purchase from BT.

6.9 As explained above, to date Ofcom has not been persuaded that BT's proposals for the price regulation of PPC terminating segments are appropriate. However, Ofcom will review that issue after the consultation period in the light of any new information it receives as part of the responses.

Question 12: *Do respondents believe BT's proposal is preferable to proposals set out in the consultation document and those established in the LLMR?*

Next Steps

6.10 Ofcom welcomes comments on the proposals contained in this consultation document and in particular on the specified questions. The closing date for comments is 30 July 2004. Ofcom intends to finalise its proposals thereafter in time for the implementation of the control on 1 October 2004.

Section 7

Responding to this consultation

How to respond

7.1 Ofcom invites written views and comments on the issues raised in this document, to be made by 5pm on 30 July 2004.

7.2 Ofcom strongly prefers to receive responses as e-mail attachments, in Microsoft Word format, as this helps us to process the responses quickly and efficiently. Please can you send your response to Katherine.Dinsdale@ofcom.org.uk.

7.3 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Katherine Dinsdale
Competition & Markets
4th Floor
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Tel: 020 7783 4166
Fax: 020 7783 4109

7.4 Note that we do not need a hard copy in addition to an electronic version. Also note that Ofcom will not routinely acknowledge receipt of responses.

7.5 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex X. It would also help if you can explain why you hold your views, and how Ofcom's proposals would impact you.

Further information

7.6 If you have any questions about the issues raised in this consultation, or need advice on the appropriate form of response, please contact Katherine Dinsdale on 020 7783 4166.

Confidentiality

7.7 Ofcom thinks it is important for everyone interested in an issue to see the views expressed by other consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, as soon as possible after the consultation period has ended.

7.8 All comments will be treated as non-confidential unless respondents specify that part or all of the response is confidential and should not be disclosed. Please can you place any confidential parts of a response in a separate annex, so that non-confidential parts may be published along with the respondent's identity.

7.9 We would be grateful if you could speed up our response-handling processes by completing a response cover sheet (see Annex 3) to indicate whether or not there are confidentiality issues. The cover sheet can be downloaded from Ofcom's website from the page where this consultation document appears.

7.10 Please also note that copyright in responses will be assumed to be relinquished unless specifically retained.

Next steps

7.11 Following the end of the consultation period, Ofcom intends to publish a statement and require implementation of the longer term PPC terminating segments charge control by 1 October 2004.

7.12 Please note that you can register to get automatic notifications of when Ofcom documents are published, at http://www.ofcom.org.uk/static/subscribe/select_list.htm.

Ofcom's consultation processes

7.13 Ofcom is keen to make responding to consultations easy, and has published some consultation principles (see Annex 1) which it seeks to follow, including on the length of consultations.

Complex consultations

7.14 Ofcom will generally allow 10 weeks for complicated policy issues. This is slightly shorter than the Cabinet Office guidelines on consultation (12 weeks). But Ofcom thinks this is appropriate given the speed with which the communications industry changes. Ofcom will also aim to speak informally to a number of people and organisations before the 10-week period to test our thinking and to listen to their thoughts.

Shorter consultations

7.15 Some formal consultations will need to be shorter than 10 weeks. In those cases Ofcom will usually aim to allow five weeks. However, the time may vary depending on the issue. Consultations may be shorter than 10 weeks if:

- the issue or community involved is small or only affects a particular group, which has been identified ahead of time;
- a proposal will have a limited effect on a market;
- a proposal is only a limited amendment to existing policy; or
- an issue needs to be looked at urgently.

7.16 We may also run a shorter formal consultation process if:

- the law says Ofcom must act within a specific time period;
- the organisations involved in a specific consultation agree they want a faster timetable; or
- this is the second consultation on the same issue.

7.17 In this instance Ofcom has adopted a five week consultation period because the proposal is a limited amendment to existing policy, and the proposals set out in the consultation need to be implemented urgently.

7.18 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk. We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, whose views are less likely to be obtained in a formal consultation.

7.19 If you would like to discuss these issues, you can alternatively contact Philip Rutnam, Partner, Competition and Strategic Resources, who is Ofcom's consultation champion:

Philip Rutnam
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Tel: 020 7981 3585
Fax: 020 7981 3333
E-mail: philip.rutnam@ofcom.org.uk

Annex A

Ofcom's consultation principles

A.1 Ofcom has published the following seven principles that it will follow for each written consultation:

Before the consultation

A.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A.3 We will be clear about who we are consulting, why, on what questions and for how long.

A.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened version for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A.5 We will normally allow 10 weeks for responses, other than on dispute resolution.

A.6 There will be a person within Ofcom who will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. This individual (who we call the consultation champion) will also be the main person to contact with views on the way we run our consultations.

A.7 If we are not able to follow one of these principles, we will explain why. This may be because a particular issue is urgent. If we need to reduce the amount of time we have set aside for a consultation, we will let those concerned know beforehand that this is a 'red flag consultation' which needs their urgent attention.

After the consultation

A.8 We will look at each response carefully and with an open mind. We will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex B

Consultation questions

Question 1: *Do respondents agree that an RPI-X control is the appropriate form of charge control for the regulation of PPC terminating segments?*

Question 2: *Do respondents think that a four year charge control is the appropriate duration for the regulation of PPC terminating segments?*

Question 3: *Do respondents agree with Ofcom's proposals for the treatment of equipment costs within the charge control?*

Question 4: *Do respondents agree with Ofcom's proposals for the following three separate charge control baskets:*

- *point of connection (POC) equipment charges and third party equipment charges;*
- *connection of a new PPC terminating segments charges and rental and maintenance charges for low bandwidth circuits; and*
- *connection of a new PPC terminating segments charges and rental and maintenance charges for high bandwidth circuits.*

Question 5: *Do respondents agree with Ofcom's proposals to weight the charge control baskets according to prior year revenues?*

Question 6: *Do respondents agree with Ofcom's proposals for the value of X applicable to the proposed equipment cost basket?*

Question 7: *Do respondents agree with Ofcom's proposed adjustments to BT's view of the following input parameters?*

- *volume changes;*
- *asset price changes; and*
- *asset volume elasticities and cost volume elasticities.*

Question 8: *Do respondents agree with Ofcom's proposed inefficiency adjustment to BT's data?*

Question 9: *Do respondents agree with Ofcom's treatment of SDSL within the proposed charge control?*

Question 10: *Do respondents agree with Ofcom's proposals for the treatment of geographic discounts within the charge control framework?*

Question 11: *Do respondents agree with Ofcom's proposals for the treatment of volume discounts within the charge control framework?*

Question 12: *Do respondents believe BT's proposal is preferable to proposals set out in the consultation document and those established in the LLMR?*

Question 13: *Ofcom would welcome views as to the appropriate route to radial factors for Altnet PPC terminating segments and how they vary with distance*

Annex C

Consultation response cover sheet

E.1 In the interests of transparency, we will publish all consultation responses in full on our website, www.ofcom.org.uk, as soon as possible after the consultation period has ended, unless a respondent specifies that all or part of their response is confidential.

E.2 We will also refer to the contents of a response when explaining our decision, unless we are asked not to.

E.3 We have produced a cover sheet for responses (see below) and would be very grateful if you could send one with your response. This will speed up our processing of responses, and help to maintain confidentiality by allowing you to state very clearly what you do not want to be published. We will keep your completed cover sheets confidential.

E.4 We strongly prefer to receive responses in the form of a Microsoft Word attachment to an email. Our website therefore includes an electronic copy of this cover sheet, which you can download from the 'Consultations' section of our website.

E.5 Please put any confidential parts of your response in a separate annex to your response, so that they are clearly identified. This can include information such as your personal background and experience. If you want your name, contact details, or job title to remain confidential, please provide them in your cover sheet only so that we do not have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

What do you want Ofcom to keep confidential?

Nothing	☐	Name/contact details/ job title	☐
Whole response	☐	Organisation	☐
Part of the response	☐	If there is no separate annex, which parts?	

If you want part of your response, your name or your organisation to be confidential, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

Yes	☐	No	☐

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response. It can be published in full on Ofcom's website, unless otherwise specified on this cover sheet. If I have sent my response by email, Ofcom can disregard any standard email text about not disclosing email contents and attachments.

Name Signed (if hard copy)

Annex D

Notification

NOTIFICATION UNDER SECTIONS 48(2) AND 86(1) OF THE COMMUNICATIONS ACT 2003

Proposals for the modification of SMP services conditions G4 and GG4 in relation to BT for the purposes of regulating charges for PPC terminating segments

1 OFCOM, in accordance with sections 48(2) and 86(1) of the Act, hereby make the following proposals for the modification of SMP services conditions by reference to market power determinations made in relation to markets in which OFCOM are satisfied there has been no material change since those determinations were made.

2 The proposals contained in this Notification are further to the market power determinations made in a Notification under section 79 of the Act by OFCOM on 24 June 2004 whereby BT was determined to have significant market power in the following markets:

(a) traditional interface symmetric broadband origination up to and including 8Mbit/s in the UK excluding the Hull Area; and

(b) traditional interface symmetric broadband origination above 8Mbit/s up to and including 155Mbit/s in the UK excluding the Hull Area.

3 SMP services conditions G4 and GG4 currently apply to BT in the markets listed at subparagraphs (a) and (b) of paragraph 2 respectively. OFCOM are proposing to modify SMP services conditions G4 and GG4 as set out in Schedules 1 and 2 respectively to this Notification.

4 The effect of, and OFCOM's reasons for making, the proposals referred to in paragraph 3 are set out at Chapters 2, 3, 4 and 5 respectively of the explanatory statement published with this Notification.

5 OFCOM consider that the proposals referred to in paragraph 3 comply with the requirements of sections 45 to 50 and sections 78 to 92 of the Act, as appropriate and relevant to each of the proposals.

6 In making the proposals set out in this Notification, OFCOM have considered and acted in accordance with their general duties in section 3 of the Act and the six Community requirements in section 4 of the Act.

7 Representations may be made to OFCOM about the proposals set out in this Notification and the accompanying explanatory statement by 5.00pm on 30 July 2004.

8 Copies of this Notification and the accompanying explanatory statement have been sent to the Secretary of State in accordance with section 50(1)(a), the European Commission and to the regulatory authorities of every other Member State in accordance with section 50(3) of the Act.

9 In this Notification (not including the Schedules) -

(a) 'the Act' means the Communications Act 2003;

(b) 'BT' means British Telecommunications plc, whose registered company number is 1800000, and any British Telecommunications plc subsidiary or holding company, or any subsidiary of that holding company, all as defined by Section 736 of the Companies Act 1985 as amended by the Companies Act 1989;

(c) 'OFCOM' means the Office of Communications;

(d) except as otherwise defined in this Notification, words or expressions used shall have the same meaning as in the Act.

JIM NIBLETT,

Competition Policy Director

A person duly authorised in accordance with paragraph 18 of the Schedule to the Office of Communications Act 2002

24 June 2004

SCHEDULE 1

Proposed amendments to SMP services condition G4

Paragraphs G4.1-G4.4 and Annex A thereto shall be deleted and replaced as follows:

"G4.1 Without prejudice to the generality of Condition G3, and subject to paragraphs G4.6 and G4.7, the Dominant Provider shall take all reasonable steps to secure that, during any Relevant Year, the Percentage Change (determined in accordance with paragraphs G4.2 or G4.3 as appropriate) in:

(a) the aggregate of charges for the products and services listed in Annex A to this Condition; and

(b) each of the charges for the products and services listed in Annex B to this Condition,

is not more than the Controlling Percentage (determined in accordance with paragraph G4.5).

G4.2 The Percentage Change for the purposes of the category of products and services specified in paragraph G4.1(a) shall be calculated by employing the following formula:

$$C = \left[\frac{\sum_{i=1}^{n} \frac{R_{ti} V_{(t-1)i}}{V_{ti}} - \sum_{i=1}^{n} R_{(t-1)i}}{\sum_{i=1}^{n} R_{(t-1)i}} \right]$$

where:

C is the Percentage Change in the aggregate of charges for the products and services in the category specified in paragraph G4.1(a);

$_n$ = the number of specific such products and services;

$R_{(t-1)i}$ is the revenue from such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph G4.4 applies, then $R_{(t-1)i}$ shall be calculated using the relevant formula specified in that paragraph;

R_{ti} is the revenue from such products and services in the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph G4.4 applies, then R_{ti} shall be calculated using the relevant formula specified in that paragraph;

$V_{(t-1)i}$ is the actual volume of such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such product or services;

V_{ti} is the volume of transactions of such products and services in the Relevant Year where $_i$ is one of the specific such products or services.

G4.3 The Percentage Change for the purposes of the category of products and services specified in paragraph G4.1(b) shall be calculated by employing the following formula:

$$C = \left[\frac{\frac{R_{ti} V_{(t-1)i}}{V_{ti}} - R_{(t-1)i}}{R_{(t-1)i}} \right]$$

where:

C is the Percentage Change in the aggregate of charges for the products and services in the category specified in paragraph G4.1(b);

n = the number of specific such products and services;

$R_{(t-1)i}$ is the revenue from such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph G4.4 applies, then $R_{(t-1)i}$ shall be calculated using the relevant formula specified in that paragraph;

R_{ti} is the revenue from such products and services in the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph G4.4 applies, then R_{ti} shall be calculated using the relevant formula specified in that paragraph;

$V_{(t-1)i}$ is the actual volume of such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such product or services;

V_{ti} is the volume of transactions of such products and services in the Relevant Year where $_i$ is one of the specific such products or services.

G4.4 Where the Dominant Provider, in respect of a particular geographic area, offers a charge for any of the products and services in either of the categories specified in paragraph G4.1(a) or (b) which is less than the charge in respect of that product or service in any other area in the UK (that is, applies a geographic discount), then the relevant figure represented by R_{ti} and $R_{(t-1)i}$ in the Percentage Change formula in paragraphs G4.2 and G4.3 shall be calculated using the following formulae as appropriate:

$$R_{ti} = \sum_{j=1}^{g} \frac{R_{dtij}}{(1 - D_{tij})} + \sum_{j=g+1}^{m} R_{utij}$$

$$R_{(t-1)i} = \sum_{j=1}^{g} \frac{R_{d(t-1)ij}}{(1 - D_{(t-1)ij})} + \sum_{j=g+1}^{m} R_{u(t-1)ij}$$

Where:

R_{ti}= the revenue from products and services $_i$ in the Relevant Year applicable to calculating compliance with the charge control

R_{dtij} = the revenue from products and services $_i$ in area j in the Relevant Year for those areas to which a geographic discount has been applied

R_{utij}= the revenue from products and services $_i$ area $_j$ in the Relevant Year for those areas to which a geographic discount has not been applied

D_{tij} = the percentage discount against the products and services $_i$ in the Relevant Year in area j

$R_{(t-1)ij}$ = the revenue from products and services $_i$ in area j in the year immediately preceding the Relevant Year applicable to calculating compliance with the charge control

$R_{d(t-1)ij}$ = the revenue from products and services $_i$ in area j in the year immediately preceding the Relevant Year for those areas to which a geographic discount has been applied

$R_{u(t-1)ij}$ = the revenue from products and services $_i$ in area $_j$ in the year immediately preceding the Relevant Year for those areas to which a geographic discount has not been applied

$D_{(t-1)ij}$ = the percentage discount against the products and services $_i$ in the year immediately preceding the Relevant Year in area $_j$

$_g$ = the number of areas in which a discount applies

$_m$ = the total number of areas

G4.5 Subject to paragraphs G4.6 and G4.7, the Controlling Percentage in relation to any Relevant Year means RPI reduced:

(a) for the category of products and services specified in paragraph G4.1(a), by [x][8] percentage points; and

(b) for the category of products and services specified in paragraph G4.1(b), by 8.9 percentage points.

G4.6 Where the Percentage Change in any Relevant Year is less than the Controlling Percentage, then for the purposes of paragraph G4.1 the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph G4.5, but increased by the amount of such deficiency.

[8] Ofcom is seeking views on the appropriate value of “x” within a range of 1.25% and 5%, as discussed in section 4 of the explanatory statement attached to this Notification. As set out in section 6 of the explanatory statement, Ofcom is also considering a proposal from BT regarding future pricing of PPC terminating segments which would result in the value of x being 0.5% for the period of the proposed price control but from 1 October 2005 until the end of the proposed charge control.

G4.7 Where the Percentage Change in any Relevant Year is more than the Controlling Percentage, then for the purposes of paragraph G4.1 the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph G4.5, but decreased by the amount of such excess.

G4.8 The Dominant Provider shall, no later than three months after the end of each Relevant Year, supply Ofcom, in writing, the data necessary to perform the calculation of the Percentage Change.

G4.9 Paragraphs G4.1 to G4.8 shall not apply to such extent as Ofcom may direct.

G4.10 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

G4.11 In this Condition:

(a) "Controlling Percentage" is to be determined in accordance with Condition G4.5;

(b) "Relevant Year" means any of the four periods of 12 months beginning on 1st October starting with 1st October 2004 and ending on 30 September 2008;

(c) "Retail Prices Index" means the index of retail prices complied by an agency or a public body on behalf of Her Majesty's Government or a governmental department (which is the Office of National Statistics at the time of publication of this Notification) from time to time in respect of all items; and

(d) "RPI" means the amount of the change in the Retail Prices Index in the period of twelve months ending on 30th June immediately before the beginning of a Relevant Year, expressed as a percentage (rounded to two decimal places) of that Retail Prices Index as at the beginning of that first mentioned period.

G4.12 In the Annexes to this Condition:

(a) "Partial Private Circuit" or "PPC" means a circuit provided pursuant to the PPC Contract and in accordance with any directions made by Ofcom pursuant to SMP services conditions G1, G3 or G7 under section 49 of the Act; and

(b) "PPC Contract" means the Dominant Provider's Standard PPC Handover Agreement as at the date of publication of this Condition.

Annex A to Condition G4

Products and services subject to charge control pursuant to paragraphs G4.1(a)

1. Connection services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

    - 64 kbit/s – 960 kbit/s
    - 1 Mbit/s (from 23/10/2001)
    - 2 Mbit/s

2. Rental and maintenance services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

    - 64k
    - 128k
    - 192k
    - 256k
    - 320k
    - 384k
    - 448k
    - 512k
    - 576k
    - 640k
    - 704k
    - 768k
    - 832k
    - 896k
    - 960k
    - 1Mb
    - 2Mb

Annex B to Condition G4

Products and services subject to charge control pursuant to paragraphs G4.1(b)

1. Each of the following point of connection equipment products used in the provision of a Partial Private Circuit:

(a) Customer Sited Handover (CSH) products:

(i) in respect of CSH Configuration SMA-16:

- SMA-16 ADM with no trib interfaces (single fibre working) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (2 ports)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (2 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(ii) in respect of CSH Configuration SMA-4:

- SMA-4 ADM with no trib interfaces (single fibre working) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (1 port)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (1 port), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(iii) in respect of CSH Configuration MSH51:

- MSH51 ADM with no trib interfaces (single fibre working) - existing site

- MSH51 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- MSH51 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Per km from serving exchange to MSH node - single fibre working
- Per km from serving exchange to MSH node - dual fibre working
- Standby batteries if required
- STM-1 electrical trib interface (4 ports)
- STM-1 optical (1300nm) trib interface (2 ports)
- STM-1 electrical trib card (4 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (2 ports), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection
- STM1 - legacy equipment
- 16x2 - legacy equipment
- 2M Bearer Access – required for access to DPCN
- plus rental per km from POH serving exchange to DPCN node

(b) In Span Handover (ISH) products:

(i) in respect of ISH Configuration STM-16:
- SMA –16 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(ii) in respect of ISH Configuration STM-4:
- SMA-4 ADM with single STM-4 handover (1300nm)
- Optional STM-4 1550nm handover

(iii) in respect of ISH Configuration STM-1:
- SMA-4 ADM with single STM-1 handover (1300nm)
- Additional cost for STM-1 1550nm handover
- Additional STM-1 handovers (1300nm) – max 3
- Additional STM-1 handovers (1550nm) – max 3

(iv) in respect of ISH Configuration MSH51:
- MSH51 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(v) where MSH51 ISH is provided at nearest MSH node to customer:
- 2M Bearer Access – required for access to DPCN
- plus rental per km from POH serving exchange to DPCN node

2. Each of the following third party equipment products used in the provision of a Partial Private Circuit:

(a) Third party customer link infrastructure:
- KiloStream NTU 64k – 256k on existing copper
- KiloStream NTU 64k – 256k on new copper
- KiloStream NTU 320k – 640k on existing copper

- Kilostream NTU 320k – 640k on new copper
- Kilostream NTU 128k – 640k on 2Mb infrastructure
- Kilostream NTU 704k – 960k all delivery options
- 1Mb/s circuit on existing copper (from 23/10/2001)
- 1Mb/s circuit on new copper (from 23/10/2001)
- 2Mbit/s circuit on HDSL on existing copper
- 2Mbit/s circuit on HDSL on new copper
- First 2Mbit/s circuit on 4x2 at existing site
- First 2Mbit/s circuit on 16x2 at existing site
- Additional Charge for 4x2 and 16x2 new site
- Subsequent 2Mbit/s circuit on existing PPC 4x2 or 16x2

(b) in respect of third party customer sited SMA-1 ADM:

- SMA-1 ADM with no trib interfaces (single fibre working) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 2Mbit/s trib card (16 ports)

(c) in respect of third party customer sited SMA-4 ADM:

- SMA-4 ADM with no trib interfaces (single fibre working) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 2Mbit/s trib cards (32 ports)

(d) in respect of third party customer sited SMA-16 ADM:

- SMA-16 ADM with no trib interfaces (single fibre working) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 2Mbit/s trib cards (32 ports)

SCHEDULE 2

Proposed amendments to SMP services condition GG4

Paragraphs GG4.1-GG4.4 and Annex A thereto shall be deleted and replaced as follows:

"GG4.1 Without prejudice to the generality of Condition GG3, and subject to paragraphs GG4.6 and GG4.7, the Dominant Provider shall take all reasonable steps to secure that, during any Relevant Year, the Percentage Change (determined in accordance with paragraphs GG4.2 or GG4.3 as appropriate) in:

(a) the aggregate of charges for the products and services listed in Annex A to this Condition; and
(b) each of the charges for the products and services listed in Annex B to this Condition,

is not more than the Controlling Percentage (determined in accordance with paragraph GG4.5).

GG4.2 The Percentage Change for the purposes of the category of products and services specified in paragraph GG4.1(a) shall be calculated by employing the following formula:

$$C = \left[\frac{\sum_{i=1}^{n} \frac{R_{ti} V_{(t-1)i}}{V_{ti}} - \sum_{i=1}^{n} R_{(t-1)i}}{\sum_{i=1}^{n} R_{(t-1)i}} \right]$$

where:

C is the Percentage Change in the aggregate of charges for the products and services in the category specified in paragraph GG4.1(a);

$_n$ = the number of specific such products and services;

$R_{(t-1)i}$ is the revenue from such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph GG4.4 applies, then $R_{(t-1)i}$ shall be calculated using the relevant formula specified in that paragraph;

R_{ti} is the revenue from such products and services in the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph GG4.4 applies, then R_{ti} shall be calculated using the relevant formula specified in that paragraph;

$V_{(t-1)i}$ is the actual volume of such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such product or services;

V_{ti} is the volume of transactions of such products and services in the Relevant Year where $_i$ is one of the specific such products or services.

GG4.3 The Percentage Change for the purposes of the category of products and services specified in paragraph GG4.1(b) shall be calculated by employing the following formula:

$$C = \left[\frac{\frac{R_{ti} V_{(t-1)i}}{V_{ti}} - R_{(t-1)i}}{R_{(t-1)i}} \right]$$

where:

C is the Percentage Change in the aggregate of charges for the products and services in the category specified in paragraph GG4.1(b);

$_n$ = the number of specific such products and services;

$R_{(t-1)i}$ is the revenue from such products and services in the year immediately preceding the Relevant Year where i is one of the specific such products or services. Where paragraph GG4.4 applies, then $R_{(t-1)i}$ shall be calculated using the relevant formula specified in that paragraph;

R_{ti} is the revenue from such products and services in the Relevant Year where $_i$ is one of the specific such products or services. Where paragraph GG4.4 applies, then R_{ti} shall be calculated using the relevant formula specified in that paragraph;

$V_{(t-1)i}$ is the actual volume of such products and services in the year immediately preceding the Relevant Year where $_i$ is one of the specific such product or services;

V_{ti} is the volume of transactions of such products and services in the Relevant Year where $_i$ is one of the specific such products or services.

GG4.4 Where the Dominant Provider, in respect of a particular geographic area, offers a charge for any of the products and services in either of the categories specified in paragraph GG4.1(a) or (b) which is less than the charge in respect of that product or service in any other area in the UK (that is, applies a geographic discount), then the relevant figure represented by $R_{(t-1)i}$ and R_{ti} in the Percentage Change formula in paragraphs GG4.2 and GG4.3 shall be calculated using the following formulae as appropriate:

$$R_{ti} = \sum_{j=1}^{g} \frac{R_{dtij}}{(1 - D_{tij})} + \sum_{j=g+1}^{m} R_{utij}$$

$$R_{(t-1)i} = \sum_{j=1}^{g} \frac{R_{d(t-1)ij}}{(1 - D_{(t-1)ij})} + \sum_{j=g+1}^{m} R_{u(t-1)ij}$$

Where:

R_{ti}= the revenue from products and services $_i$ in the Relevant Year applicable to calculating compliance with the charge control

R_{dtij} = the revenue from products and services $_i$ in area $_j$ in the Relevant Year for those areas to which a geographic discount has been applied

R_{utij}= the revenue from products and services $_i$ area $_j$ in the Relevant Year for those areas to which a geographic discount has not been applied

D_{tij} = the percentage discount against the products and services $_i$ in the Relevant Year in area $_j$

$R_{(t-1)ij}$ = the revenue from products and services $_i$ in area $_j$ in the year immediately preceding the Relevant Year applicable to calculating compliance with the charge control

$R_{d(t-1)ij}$ = the revenue from products and services $_i$ in area $_j$ in the year immediately preceding the Relevant Year for those areas to which a geographic discount has been applied

$R_{u(t-1)ij}$ = the revenue from products and services $_i$ in area $_j$ in the year immediately preceding the Relevant Year for those areas to which a geographic discount has not been applied

$D_{(t-1)ij}$ = the percentage discount against the products and services $_i$ in the year immediately preceding the Relevant Year in area $_j$

$_g$ = the number of areas in which a discount applies

$_m$ = the total number of areas

GG4.5 Subject to paragraphs GG4.6 and GG4.7, the Controlling Percentage in relation to any Relevant Year means RPI reduced:

(a) for the category of products and services specified in paragraph GG4.1(a), by [x][9] percentage points; and
(b) for the category of products and services specified in paragraph GG4.1(b), by 8.9 percentage points.

GG4.6 Where the Percentage Change in any Relevant Year is less than the Controlling Percentage, then for the purposes of paragraph GG4.1 the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph GG4.5, but increased by the amount of such deficiency.

GG4.7 Where the Percentage Change in any Relevant Year is more than the Controlling Percentage, then for the purposes of paragraph GG4.1 the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph GG4.5, but decreased by the amount of such excess.

[9] Ofcom is seeking views on the appropriate value of “x” within a range of 1.25% and 5%, as discussed in section 4 of the explanatory statement attached to this Notification. As set out in section 6 of the explanatory statement, Ofcom is also considering a proposal from BT regarding future pricing of PPC terminating segments which would result in the value of x being 0.5% for the period of the proposed price control but from 1 October 2005 until the end of the proposed charge control.

GG4.8 The Dominant Provider shall, no later than three months after the end of each Relevant Year, supply Ofcom, in writing, the data necessary to perform the calculation of the Percentage Change.

GG4.9 Paragraphs GG4.1 to GG4.8 shall not apply to such extent as Ofcom may direct.

GG4.10 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

GG4.11 In this Condition:

(a) "Controlling Percentage" is to be determined in accordance with Condition GG4.5;
(b) "Relevant Year" means any of the four periods of 12 months beginning on 1st October starting with 1st October 2004 and ending on 30 September 2008;
(c) "Retail Prices Index" means the index of retail prices complied by an agency or a public body on behalf of Her Majesty's Government or a governmental department (which is the Office of National Statistics at the time of publication of this Notification) from time to time in respect of all items; and
(d) "RPI" means the amount of the change in the Retail Prices Index in the period of twelve months ending on 30th June immediately before the beginning of a Relevant Year, expressed as a percentage (rounded to two decimal places) of that Retail Prices Index as at the beginning of that first mentioned period.

GG4.12 In the Annexes to this Condition:

(a) "Partial Private Circuit" or "PPC" means a circuit provided pursuant to the PPC Contract and in accordance with any directions made by Ofcom pursuant to SMP services conditions G1, G3 or G7 under section 49 of the Act; and

(b) "PPC Contract" means the Dominant Provider's Standard PPC Handover Agreement as at the date of publication of this Condition.

Annex A to Condition GG4

Products and services subject to charge control pursuant to paragraphs GG4.1(a)

1. Connection services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

- 34 Mbit/s – 45 Mbit/s
- 140 Mbit/s – 155 Mbit/s

2. Rental and maintenance services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

- 34 Mbit/s – 45 Mbit/s
- 140 Mbit/s – 155 Mbit/s

Annex B to Condition GG4

Products and services subject to charge control pursuant to paragraphs GG4.1(b)

1. Each of the following point of connection equipment products used in the provision of a Partial Private Circuit:

(a) Customer Sited Handover (CSH) products:

(i) in respect of CSH Configuration SMA-16:
- SMA-16 ADM with no trib interfaces (single fibre working) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (2 ports)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (2 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(ii) in respect of CSH Configuration SMA-4:
- SMA-4 ADM with no trib interfaces (single fibre working) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (1 port)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (1 port), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(iii) in respect of CSH Configuration MSH51:
- MSH51 ADM with no trib interfaces (single fibre working) - existing site
- MSH51 ADM with no trib interfaces (dual fibre working 1300nm) - existing site

- MSH51 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Per km from serving exchange to MSH node - single fibre working
- Per km from serving exchange to MSH node - dual fibre working
- Standby batteries if required
- STM-1 electrical trib interface (4 ports)
- STM-1 optical (1300nm) trib interface (2 ports)
- STM-1 electrical trib card (4 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (2 ports), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection
- STM1 - legacy equipment

(b) In Span Handover (ISH) products:

(i) in respect of ISH Configuration STM-16:

- SMA –16 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(ii) in respect of ISH Configuration STM-4:

- SMA-4 ADM with single STM-4 handover (1300nm)
- Optional STM-4 1550nm handover

(iii) in respect of ISH Configuration STM-1:

- SMA-4 ADM with single STM-1 handover (1300nm)
- Additional cost for STM-1 1550nm handover
- Additional STM-1 handovers (1300nm) – max 3
- Additional STM-1 handovers (1550nm) – max 3

(iv) in respect of ISH Configuration MSH51:

- MSH51 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(v) where MSH51 ISH is provided at nearest MSH node to customer:

2. Each of the following third party equipment products used in the provision of a Partial Private Circuit:

(a) in respect of third party customer sited SMA-1 ADM:

- SMA-1 ADM with no trib interfaces (single fibre working) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 34Mbit/s trib card (3 ports)
- 45Mbit/s trib card (3 ports)
- STM-1 electrical trib card (1port)
- STM-1 optical (1300nm) trib card (1 port)

- 140Mbit/s electrical trib card (1 port)

(b) in respect of third party customer sited SMA-4 ADM:

- SMA-4 ADM with no trib interfaces (single fibre working) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 34Mbit/s trib card (3 ports)
- 45Mbit/s trib card (3 ports)
- STM-1 electrical trib card (1port)
- STM-1 optical (1300nm) trib card (1 port)
- 140Mbit/s electrical trib card (1 port)
- STM-4 optical (1300nm) trib card (1 port)

(c) in respect of third party customer sited SMA-16 ADM:

- SMA-16 ADM with no trib interfaces (single fibre working) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 34Mbit/s trib card (3 ports)
- 45Mbit/s trib card (3 ports)
- STM-1 electrical trib card (1port)
- STM-1 optical (1300nm) trib card (1 port)
- 140Mbit/s electrical trib card (1 port)
- STM-4 optical (1300nm) trib card (1 port)

(d) in respect of third party customer sited MSH-51C ADM:

- MSH51 with no trib interfaces (single fibre working) - existing site
- MSH51 with no trib interfaces (dual fibre working 1300nm) - existing site
- MSH51 with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Per km from serving exchange to MSH node - single fibre working
- Per km from serving exchange to MSH node - dual fibre working
- Standby batteries if required
- STM-1 electrical trib card (4 ports)
- STM-1 optical (1300nm) trib card (2 ports)
- 140Mbit/s electrical trib card (1 port)
- STM-4 optical (1300nm) trib card (1 port)

Annex E

Ofcom's forecasting Model

Introduction

E.1 As set out in section 4, Ofcom has developed a cost forecasting model in order to calculate a value of X for the PPC charge control. The X is the amount each year by which BT will be required to reduce charges within each charge control basket. This annex:

- sets out Ofcom's methodology;
- provides an overview of the model;
- provides details of the construction of the model and the model's calculations; and
- provides results based on different assumptions of key inputs.

Ofcom's methodology

E.2 Ofcom's methodology for forecasting BT's costs of providing PPC terminating segments is consistent with that used for other charge controls on BT. Within the cost forecasting model there are three broad categories of costs: cost of capital, depreciation and operating expenditure.

E.3 Ofcom's methodology involves forecasting how costs will change over the period of the charge control for different categories of products and services. This is done on the basis of grouping these products and services and associated costs into different baskets, as explained in section 3. From understanding how costs change over the period of the charge control it is possible to calculate the necessary reductions in charges required to ensure that charges are at the forecast efficient level at the end of the control.

Overview of the model

E.4 The following sections outline how the model is structured and provide details of the data inputs and main calculations in the model.

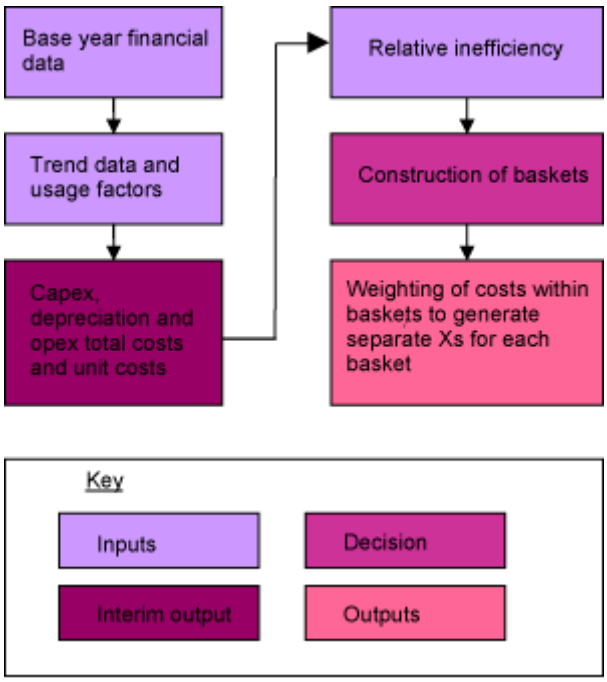
E.5 The objective of the cost forecasting model is to forecast how BT's costs for PPC terminating segments will change over the period of the charge control. This then allows different groups of costs to be combined into different possible charge control baskets. The model also has functionality to determine the values of X for different charge control periods as well as to adjust the input values for the model parameters which influence the value of X, to facilitate sensitivity analysis.

E.6 The model can be described in four blocks. These are:

- inputs, in the form of base year financial data, trend data, usage factors and an assumption as to the extent of BT's relative inefficiency;
- interim outputs, in the form of total and unit costs;
- the construction of the charge control baskets; and
- application of appropriate weightings to the forecast costs to calculate the value of X for each basket.

E.7 It is useful to understand in broad terms how these different blocks within the model are related and the calculation flow to determine the values of X. The calculation flow involving these blocks is represented simply in figure E1.

Figure E1 – Ofcom's PPC terminating segments cost forecasting model



E.8 From figure E1 it can be seen that the starting point of the forecasting model is the base year data. Following this, the various trend data is applied to the base year data in an appropriate manner. The mechanics of this is explained in further detail below.

E.9 This process generates interim outputs in the shape of total and unit costs for the cost of capital and depreciation and for operating expenditure.

E.10 The model consists of three different dimensions:

- component types, which are taken from BT's Regulatory Financial Statements;
- bandwidths and;
- forecast years.

E.11 Additionally, some data is provided by asset types. Where this is the case, Ofcom has restated this data by component type. This conversion is achieved by weighting the data by asset type by the gross replacement cost (GRC) by asset type to provide the data by component type.

E.12 The final block of the model manipulates the data into an appropriate format to allow different options of charge control baskets to be modelled. Once the data is in the appropriate format, the figure used to account for BT's relative inefficiency compared to the US LECs[10] is factored into the X calculations.

[10] This is from the conclusions of the NERA efficiency study, discussed in section 4. As set out there, Ofcom assumes BT's relative efficiency is in the range 5% to 10%.

E.13 The inputs to each of these blocks set out above and the source of the data used are described in the following section.

Ofcom's PPC terminating segments cost forecasting model

E.14 Ofcom's PPC terminating segments cost forecasting model is contained in one stand alone workbook. Ofcom's forecasting model is used to generate values of X for the two of the three charge control baskets (low bandwidth and high bandwidth).

E.15 There are three broad categories of worksheet contained in the model. These are:

- input worksheets, which contain either raw data provided by BT or manipulated inputs (which consist of the raw data provided by BT being reformatted for the purposes of the model);
- trend data worksheets, which set out the trends in the model parameters that can change over time; and
- calculation worksheets, which forecast BT's costs (using the input data and the trend data in the other worksheets) and calculate the values of X for the charge control baskets.

Input worksheets

E.16 The inputs to the model are described in table E1.

Table E1 – Description of the contents of the input worksheets in the PPC terminating segments cost forecasting model

Name	Description
Financial information	This data is based on the outputs from BT's regulatory costing systems and relates to 2001/02 and 2002/03. There is separate data for Gross Replacement Cost (GRC) Accumulated Depreciation, Net Replacement Cost, Supplementary Depreciation, HCA Depreciation, Capital Expenditure and Operating Expenditure (definitions are included in the Glossary in annex I).
Volumes	This sets out BT's forecasts of demand for PPC terminating segments to 2006/07. These forecasts are provided separately for "BT to Altnets", "BT to BT" and "BT to mobile operators". These forecasts are also provided at different bandwidths. The volume input worksheets also include the option of generating forecasts of volumes to 2008/09, based on different assumptions.
Asset price changes	This worksheet sets out BT's view of how the price of each of its asset types is likely to change on an annual basis to 2006/07. The data used to forecast the values of X is linked to the scenarios worksheet to allow different input assumptions to be modelled.
AVEs	This worksheet sets out BT's estimate of its AVEs, by asset type. BT calculates this as the LRIC:FAC ratio. The data used to forecast the values of X is linked to the scenarios worksheet to allow different input assumptions to be modelled.
CVEs	This worksheet sets out BT's estimate of its CVEs, by operating cost category. The data used to forecast the

	values of X is linked to the scenarios worksheet to allow different input assumptions to be modelled.
Relative usage factors	These worksheets reformat BT's raw data provided for its relative usage factors. Usage factors are factors provided by BT and show how different PPC terminating segments circuits use different network components. There are two separate blocks of relative usage factors: those for BT to Altnet PPC terminating segments and those for BT to BT (and BT to mobile operators) PPC terminating segments. The relative usage factors are provided by bandwidth and by component type. As these are relative usage factors they do not measure the absolute extent to which each PPC terminating segments at each bandwidth uses each component type. Instead usage is expressed relative to an index normalised at 1.
Asset lives	This worksheet sets out BT's view of the lifetime of each of its asset types. BT has two approaches to estimating the lifetime of its asset types. These are the weighted book life and the effective life.[11]

E.17 As explained in Section 4, Ofcom does not agree that the values of the inputs provided by BT are necessarily the most appropriate values. Therefore, Ofcom has assumed alternative values for the inputs for some of the parameters of the model. In particular, as noted in table E1 BT has provided its view of assets lives using the weighted book life and the effective life of its assets. Ofcom does not agree that this is the appropriate measure of asset lives for use within the forecasting model. The asset lives to be used in the forecasting model should be calculated to be consistent with other data in the model, in particular, the depreciation data and the asset base data , which is provided from BT's Regulatory Financial Statements. This means that the default assumption in the forecasting model is to set asset lives equal to GRC divided by operating capability maintenance (OCM) depreciation. The impact on the value of X of different input assumptions is shown in the final section of this annex.

Trend data worksheets

E.18 As noted above the model also contains trend data worksheets. These are described below.

Component volume trends

E.19 The first trend data worksheet calculates the component volumes that are used in the calculation of unit costs and sets out how these component volumes change over the period of the control. This is done by taking the volume input data described above, separately for BT to altnet, BT to BT and BT to mobile operator circuits (which are provided by bandwidth) and multiplying this by the relative usage factor data, which is provided by bandwidth and component type. As noted in table E1 above there are separate relative usage factors for PPC terminating segments sold to altnets and PPC terminating segments sold to BT and mobile operators. In order to generate component volumes by bandwidth it is necessary to sum the volumes in order to produce a single set

[11] The weighted book life takes BT's book life of assets and produces an average weighted life according to the GBV of each asset grouping. The effective life is the remaining life of the assets to the common expiry date (CED).

of component volumes by bandwidth, for each year of the charge control. It is with these volumes that the forecasting model forecasts costs over the period of the control.

E.20 The second trend summary worksheet includes forecasts of component volumes by bandwidth over the period of the charge control. In addition, it also includes the trend data set out in table E2.

Table E2 – Data included in the trend data worksheet

Trend data	Description
Component volumes by bandwidth	This is the data generated by the first trend data worksheet.
Component volume change	This is the year on year change in component volumes, at an aggregate level.
RPI inflation	This is historic and forecast rates of inflation. Ofcom's inflation forecasts are based on the expected rate of inflation referenced against government bonds.
Real pre-tax cost of capital	This is an estimate of BT's nominal pre-tax cost of capital adjusted for inflation. A detailed summary of Ofcom's approach to estimating BT's nominal pre-tax cost of capital is provided at Annex G.
Average asset life	This is the average asset life data from the asset life data input worksheet described in table E1 presented by component type.
Nominal price change	This is the data generated in the asset price change input worksheet described in table E1 presented by component type.
Real price change	This is the nominal price change data from above adjusted for inflation.
AVEs	This is the AVE input data described in table E1 presented by component type.
CVEs	This is the CVE input data described in table E1 presented by component type.
Opex price trends	This is an assumption about the trend in operating costs, split into pay and non-pay related costs.

The calculation worksheets

E.21 This is where the input data and the trend data is used to forecast the change in costs over the period of the charge control. Each of the calculation worksheets are described in turn below.

Capital and depreciation forecast

E.22 This worksheet forecasts how the capital and depreciation costs associated with the provision of PPC terminating segments changes over the period of the charge control.

E.23 This is done in two stages. First the "steady state" i.e. no volume growth, level of costs are forecast. Second the "additional" i.e. with a change of volume, level of costs are forecast. The output of this worksheet is the sum of these two stages.

Table E3 - The steady state capital and depreciation costs

Calculation	Description
GRC	The base year GRC is taken from BT's base year Regulatory Financial Statements data. The forecast is calculated by multiplying the previous year values by the nominal price trend, described in table E2. In the steady state it is implicitly assumed that disposals and capital expenditure are equal.
Operating capability maintenance (OCM) depreciation	The base year OCM depreciation is calculated by summing the HCA depreciation and the CCA depreciation in the base year. The forecasts are calculated by dividing the GRC in the relevant year by the average asset life, described in table E1.
Capital expenditure	The base year capital expenditure is equal to the OCM depreciation. The forecasts are calculated by multiplying the previous year value by the nominal asset price change.
Cumulative OCM depreciation	The base year cumulative OCM depreciation is the GRC minus the net replacement cost (NRC). The forecast cumulative OCM depreciation is calculated by multiplying the previous year value by the nominal price change and adding on the current year OCM depreciation.
NRC	The base year NRC is taken from BT's base year Regulatory Financial Statements data. The forecasts are calculated by adding to the previous year NRC the product of half of the difference between the previous year capex and OCM depreciation and the nominal price trend plus half of the difference between the current year capex and the current year OCM depreciation. This allows for the cost of capital to be earned on the mean capital employed for the year.
Net current assets	The base year data is taken from BT's base year Regulatory Financial Statements data. The forecasts are calculated by multiplying the previous year net current assets by the inflation rate.

The additional costs

E.24 For the additional costs, the base year data is always equal to zero because by definition, there is no additional volume growth in these years.

Table E4 – Additional capital and depreciation costs associated with volume growth

Calculation	Description
Additional capex	The forecast is calculated by multiplying the previous year total GRC by the current year asset price trend, multiplying this by the current year AVE and multiplying this by the component volume change.
Additional GRC	The forecast is calculated by multiplying the previous year additional GRC by the sum of the asset price trend plus half of the previous year additional capex plus half of the current year additional capex. This is calculated over two years because this makes the calculation consistent with a mid-year value.

Additional OCM depreciation	The forecast is calculated by dividing the current year additional GRC by the average asset life.
Additional cumulative OCM depreciation	The forecast is calculated by multiplying the previous year additional cumulative depreciation by the nominal price trend, and then adding the current year additional depreciation.
Additional NRC	The forecast is calculated by subtracting the additional cumulative depreciation from the additional GRC.

E.25 From this point it is possible to calculate the total capital and depreciation costs. The model does this in the way described in Table E5.

Table E5 – Total capital and depreciation costs

Calculation	Description
Total GRC	This is the sum of steady state GRC and additional GRC.
Real return on capital	This is the sum of steady state net current assets plus steady state NRC plus additional NRC, all divided by the compound rate of RPI and then all multiplied by the real pre tax cost of capital. The first three components of this calculation represent the working capital, the fixed assets. The fourth and fifth components calculate the real return on these assets.
Real depreciation	This is calculated by dividing the sum of steady state depreciation and additional depreciation by the compound rate of RPI.
Real total holding loss	This is calculated by multiplying the real price change by the real steady state additional NRC minus half the difference between the additional real capital expenditure and the additional real depreciation. The real total holding loss calculates the decline in the value of the asset base due to asset price changes.
Real total capital and depreciation cost	This is calculated by summing the real return on capital plus the real depreciation plus the real total holding loss
Real unit capital cost	This is calculated by dividing the real total capital and depreciation cost by the component volumes.

Operating cost forecast worksheet

E.26 This worksheet forecasts how the operating costs associated with the provision of PPC terminating segments changes over the period of the charge control.

Table E6 – Operating costs

Calculation	Description
Component volumes	This is a repeat of the data set out in the component volumes summary sheet, showing the component volumes over the period of the control.
Component volumes change	This is the year on year change in the component volumes data above.
CVEs	This is the CVE data from the trend summary worksheet. This is split by pay and non-pay cost categories.
Factor productivity	These are assumed year on year gains in factor

gains	productivity, split by pay and non-pay cost categories before volume changes.
Operating expenditure price trends	These are assumed trends of operating expenditure prices, split by pay and non-pay cost categories.
Productivity adjusted operating expenditure trends	This is the operating expenditure price trends data from above, adjusted for factor productivity gains, split by pay and non-pay cost categories.
Non-pay component cost change	This is calculated by multiplying the component volume change data by the CVE for the non-pay cost category. The cost change for 2002/03 is 0% as there is zero volume change in this year.
Pay component cost change	This is as above for the non-pay component cost change but the component volume change data is multiplied by the CVE for the pay cost category.
Total operating costs (non-pay)	The base year data is taken from BT's base year Regulatory Financial Statements data. The forecast is calculated by multiplying the previous year value by the productivity adjusted operating cost trend and by the non-pay component cost change.
Total operating costs (pay)	The base year data is taken from BT's base year Regulatory Financial Statements data. The forecast is calculated by multiplying the previous year value by the productivity adjusted operating cost trend and by the pay component cost change.
Total operating expenditure	This is calculated by summing the total operating costs (non-pay) with the total operating costs (pay).
Unit operating expenditure	This is calculated by dividing the total operating expenditure by the component volumes.
Unit operating expenditure percent change	This is the difference between the current year unit operating expenditure and the previous year unit operating expenditure, divided by the previous year unit operating expenditure.
Real unit operating expenditure	This is calculated by dividing the unit operating expenditure by the inflation rate.

Capital, depreciation and operating expenditure worksheet

E.27 This worksheet combines the capital and depreciation unit costs and the operating expenditure unit costs to generate total costs.

Table E7 – Total costs

Calculation	Description
Real unit capital and depreciation costs	This is the real unit capital and depreciation costs included in the capital and depreciation forecast worksheet.
Real unit operating expenditure costs	This is the real unit operating expenditure costs included in the operating cost forecast worksheet.
Real unit costs	This is the sum of the real unit capital and depreciation costs and the real unit operating expenditure costs.
Real unit costs percent change	This is calculated by dividing the difference between the current year real unit cost and the previous year real unit cost by the previous year real unit cost.
Real total costs	This is calculated by multiplying the real unit costs by

	the component volumes.

Capital, depreciation and operating expenditure costs by bandwidth worksheet

E.28 This worksheet calculates the aggregate real total costs and splits these by bandwidth, using the relative usage factor data provided by BT.

Table E8 – Total costs by bandwidth

Calculation	Description
BT to Altnet relative usage factor	This is the relative usage factor data provided by BT.
Real unit costs by bandwidth	This is calculated for each year by multiplying the real unit costs in the capital, depreciation and operating expenditure worksheet by the relative usage factors.
Real total costs by bandwidth	This is calculated for each year by multiplying the total costs in the capital, depreciation and operating expenditure worksheet by the relative usage factors.

Calculation of baskets worksheet

E.29 This worksheet calculates the values of X for each of the charge control baskets. This worksheet includes the option of constructing separate baskets for the rental charges and the connection charges as well as for low bandwidth circuits and high bandwidth circuits. However, Ofcom has not proposed separate baskets for rental charges and connection charges.

Table E9 – Values of X

Calculation	Description
Real unit costs by bandwidth	This is the real unit costs by bandwidth from the capital, depreciation and operating expenditure costs by bandwidth worksheet.
Real total costs by bandwidth	This is the real total costs by bandwidth from the capital, depreciation and operating expenditure costs by bandwidth worksheet.
Real unit costs	This sums the real unit costs by bandwidth, separately for rental costs and connection costs.
Real total costs	This sums the real total costs by bandwidth, separately for rental costs and connection costs.
Basket weights	This calculates the weight of each bandwidth within each of the individual possible baskets. That is, it calculates the weights of the individual bandwidths for the low bandwidth rental, the low bandwidth connection, the high bandwidth rental and the high bandwidth connection. The weights are calculated on the basis of prior year costs.
Inefficiency factor	This is the assumed level of BT's relative inefficiency compared to the US LECs.
Basket unit costs	This is the product of the sum of the real unit costs and the basket weights, adjusted if necessary for the inefficiency factor. This is provided separately for the low bandwidth rental, the low bandwidth connection, the high bandwidth rental and the high bandwidth connection.
Compound annual growth rate (CAGR)	This is provided separately for the low bandwidth rental, the low bandwidth connection, the high

	bandwidth rental and the high bandwidth connection.
Aggregate basket weights	This calculates the relative weights of the rental and connection costs for the low band width and the high bandwidth separately, for each year of the control, based on prior year costs. This allows two separate baskets, combining rental and connection costs to be combined.
Aggregate basket unit costs	This calculates the weighted unit cost of the rental and connection costs for the low band width and the high bandwidth separately, for each year of the control, based on prior year costs.
Compound annual growth rate	This is provided separately for the low bandwidth and the high bandwidth costs.
Adjustment for RPI-7	This allows for the fact that the model is forecasting costs to the end of the charge control period i.e. 2008/09, from a point prior to the start of the charge control i.e. from 2002/03. This adjustment calculates the change in the charge required in the final four years of the charge control, given the RPI-7 price reductions implemented in the first two years and two months of the cost forecast period.

Results from the forecasting model

E.30 If BT's view of the relevant values of the parameters are used as inputs in the model, this generates values of X up to 2006/07 of +2.25 for the low bandwidth basket and -5.0 for the high bandwidth basket. Extrapolating BT's numbers to 2008/9[12] provides values of +0.25 for the low bandwidth basket and -3.5 for the high bandwidth basket.

E.31 However, for the reasons set out in Section 4, Ofcom believes that it is appropriate to make adjustments in the following areas:

- volume changes: potential lack of decline in low bandwidth volumes;
- asset price changes: average of BT's actual values;
- asset volume elasticities and cost volume elasticities: values from other charge controls on BT; and
- 3BT's relative inefficiency: 5% to 10%.

E.32 The impact of implementing each of these adjustments individually on the value of X, in comparison to the value of X derived using BT's view of input parameters, is shown in table E10.

Table E10 – Individual impact of Ofcom adjustments on values of X for the proposed charge control[13]

Adjustment	Low bandwidth	High bandwidth
BT's parameters	+0.25	-3.5
Volume forecast adjust	-0.25 to -1.25	-3.75

[12] In extrapolating BT's data, Ofcom has assumed zero volume growth for high bandwidth BT to Altnet circuits.
[13] The values of X in this table are expressed on the basis of RPI + X to illustrate the change in sign given different assumptions about the relevant parameters.

Asset price change adjustment	-0.25	-4.0
AVEs and CVEs adjustment	+2.75	-6.0
BT's relative inefficiency adjustment	-0.5 to -1.75	-4.5 to -5.75

E.33 The cumulative impact of implementing each of these adjustments one by one is shown in table E11 below.

Table E11 – Cumulative impact of Ofcom adjustments on values of X for the proposed charge control[14]

Adjustment	Low bandwidth	High bandwidth
BT's parameters	+0.25	-3.5
Volume forecast adjust	-0.25 to -1.25	-3.75
Asset price change adjustment	-1.0 to -1.75	-4.0
AVEs and CVEs adjustment	-0.25 to -3.0	-6.5
BT's relative inefficiency adjustment	-1.25 to -5.0	-7.25 to -8.5

[14] Ibid.

Annex F

Analysis of charges at start of control

Introduction

F.1 This Annex explains the analysis undertaken by Ofcom to review the updated financial information provided by BT in the course of Ofcom's project on the introduction of a long term charge control. The first part discusses the revised pricing model provided by BT with 2002/03 cost data and the second part considers BT's profitability on the sale of PPC terminating segments.

BT's Pricing Model

F.2 BT provided Ofcom with a new pricing model for PPC terminating segments using Excel workbooks populated with the latest audited financial information (2002/03) ("BT's Pricing Model"). The model derives individual charges for each service that is covered by the proposed PPC terminating segments charge control. Ofcom has scrutinized that model as part of its assessment of whether current charges should be used as the starting charges for the charge control. During the course of Ofcom's investigation into BT's Pricing Model, BT made a number of modifications to that model and the comments set out below relate to the version received by Ofcom on 30 April 2004 populated with 2002/03 cost information.

Overview of BT's Pricing Model

F.3 In outline, BT's model derives prices from BT's accounting costs, expressed on a unit volume basis, and the prices it has contracted with its suppliers for equipment. Inputs into BT's model comprise primarily of:

- total operating costs, mean capital employed and volume totals as published in BT's Regulatory Financial Statements;
- contract prices for items of capital equipment; and
- other operational and cost information.

F.4 The inputs into BT's model differ in respect of the different types of PPC terminating segments charges. The outputs of BT's model consist of a series of unit charges for each charge controlled service, including variants of each service. The charges have been categorised into 3 principal types and an explanation of how each of these have been handled within BT's model is set out below.

PPC terminating segments circuit rental and maintenance charges

F.5 Circuit rental and maintenance charges are designed to recover the ongoing costs of supplying the service in question, including, amongst other things, any depreciation charges and capital costs for fixed assets used in providing these services except to the extent the costs of these assets are recovered by way of upfront equipment and infrastructure charges. The charges are as follows:

- Local end fixed charge
- Main link fixed charge
- Main link per km charge

Equipment and infrastructure charges

F.6 Equipment and infrastructure charges are designed to recover the purchase price of the asset in question and other directly attributable costs required to bring the asset into working condition for its intended use. These charges relate to; points of connection (POC), equipment connection charges, third party customer link infrastructure single charges, and any additional duct/fibre/copper. For POC equipment there is an additional rental charge to cover the maintenance costs associated with that equipment.

Circuit connection charges

F.7 Circuit connection charges are designed to recover the one-off set up costs associated with the provisioning of a circuit through BT's network on an end to end basis. These charges should primarily comprise of labour costs and spares and not relate to costs either recovered by rental or upfront equipment & infrastructure charges.

F.8 In respect of each and every wholesale charge BT includes an element to recover its wholesale selling costs.

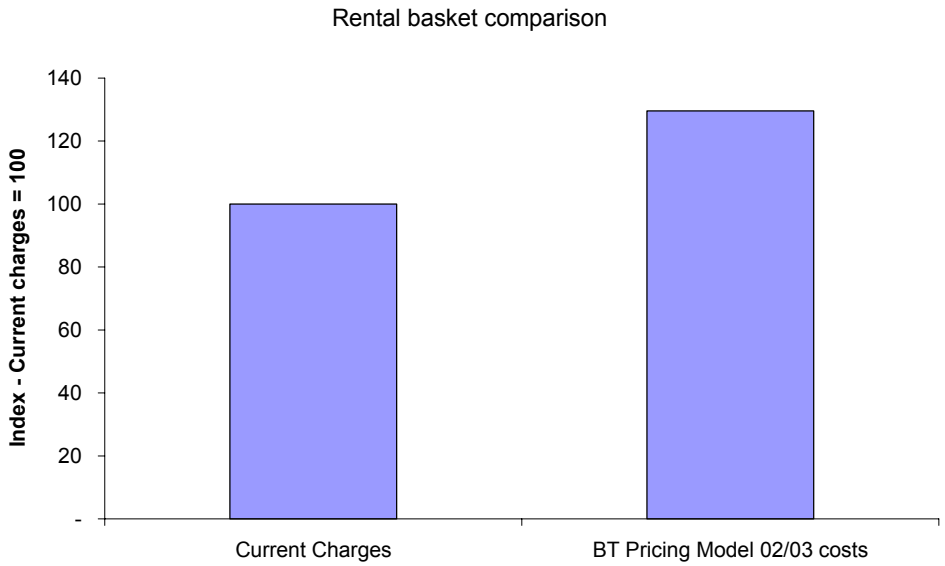
Assessment of BT's Pricing Model's Outputs

F.9 BT's Pricing Model, populated with 2002/03 cost data, produces a set of hypothetical PPC terminating segments charges which Ofcom has compared with current charges ie those prevailing in 2002/03. This comparison reveals two main trends:

- a significant increase in many charges, most notably local end fixed charges, main link fixed charges, and main link per km charges;
- small reductions (1%–7%) in POC and third party customer link equipment connection charges, but significant increases (12%-40%) in POC equipment rental charges;
- a 40% increase in the circuit connection charge for sub 1mb/s circuits, but a 50% decline in the circuit connection charge of circuits with bandwidth greater than 1mb/s.

F.10 Ofcom requested that BT provide some analysis to identify the impact on Altnets of the charges derived from BT's Pricing Model. BT did this by using actual PPC terminating segments volumes for circuits and made some assumptions about the proportion of total PPC terminating segments kms that were in the distribution network by circuit capacity. The calculated rental basket excludes equipment and connection charges and the trunk segments of a PPC terminating segments. According to BT's analysis the charges generated by the BT's Pricing Model were 30% above current charges.

Figure F1 – Rental basket analysis, BT's Pricing Model compared to current charges



Review of BT's Pricing Model

F.11 Ofcom has carried out a detailed review of BT's Pricing Model to assess whether or not BT's model accurately reflects the cost of provision of PPC terminating segments in the year 2002/03. It has concluded for the reasons set out below that it does not.

F.12 Ofcom's review of BT's model identified a number of specific concerns regarding the robustness of the data and the methodology employed. The principle issues which have the largest impact on PPC terminating segments prices generated by BT's model and which are discussed in turn below are:

- route to radial factors; and
- the calculation of local end charges

Route to Radial Factors

F.13 The terminating per km charge incorporates 'route to radial' factors which are used to covert the per km costs from a route provisioned distance to a crow-flies or radial distance. Route to radial factors also account for the requirement for an additional standby link and should therefore always be greater than 2 on all protected routes. There are separate route to radial factors for each different bandwidth but not for the different types of circuits of the same bandwidth.

F.14 BT has used data from its CTCS (Core Transmission Costing System) on which to base its estimate of the route to radial factors. This CTCS is not used in the production of figures published in BT's Regulatory Financial Statements. The CTCS data indicates that Altnet PPC terminating segments have the highest route to radial factors of all circuits. Whilst recognising that it is possible that different types of circuits may utilise those levels of the network with high route to radial factors to a greater or lesser extent, it was of concern that the route to radial factors for Altnet PPC terminating segments should be the highest at all bandwidths.

F.15 BT argues that the route to radial factors for PPC terminating segments sold to Altnets should be used to estimate PPC terminating segment route to radial

factors. This is because if BT retail circuits are included, this would inappropriately lower the route to radial factors. Retail circuits are sold "end to end" and include trunk segments, which are more direct than terminating segments and therefore, in theory, should have lower route to radial factors. However, after analysing BT's data, Ofcom notes that the route to radial factors do not appear to be strongly correlated to distance, and thus the data set provides little support for the assertion by BT that the route to radial factors for Altnet PPC terminating segments should be highest at all bandwidths.

F.16 Furthermore, the route to radial factors used in BT's Pricing Model were considerably higher than those used in Phase 2 (see table F1 below), and while they may reflect a more accurate view of the appropriate route to radial factors, it is Ofcom's view that the data set from which BT has derived the route to radial factors is not sufficiently robust.

Table F1: Route to radial factors

Bandwidth	Route to Radial factor, Phase 2	Route to Radial factor, BT's Pricing Model
n*64kb/s	1.00	1.50
2mb/s	2.79	5.42
34mb/s	2.79	4.66
15mb/s	2.79	3.36

Question 13: *Ofcom would welcome views as to the appropriate route to radial factors for Altnet PPC terminating segments and how they vary with distance*

Local end charges

F.17 BT makes an adjustment to the costs of private circuit local ends to derive the costs for PPC terminating segments local ends. This reflects the fact that for the purpose of PPC terminating segments pricing the cost of the POC end is recovered at the third party local end and needs to be calculated separately. The POC end is assumed to have a different cost profile than the third party or teail local end reflecting a higher level of aggregation. The relative cost adjustment appears to use un-sourced cost data, and questionable assumptions regarding the proportion of aggregated local ends. The proportion of PPC terminating segments local ends and retail circuit local ends which are aggregated are based on assumptions which appear to be at odds with data regarding total local end and circuit volumes.

F.18 In addition to the review of the model methodology, Ofcom has carried out a financial review of BT's model which was designed to:

- ascertain whether all the costs and associated volume inputs into the model have been properly reconciled by BT, either directly or indirectly by intermediate reconciliations, to figures appearing in the Regulatory Financial Statements (or supplementary supporting information);
- identify any assumptions used for deriving cost inputs or volumes for use in BT's model are consistent with the way the cost inputs or volumes have been derived; and
- reach a view regarding whether the inputs (for example the network components and volumes) into BT's model are

appropriate for the derivation of individual PPC terminating segments charges primarily from an accounting perspective.

F.19 Ofcom sought to establish whether the total operating costs, mean capital employed and volume totals for each of the network components used by BT in its model have been properly extracted from the Regulatory Financial Statements. This analysis highlighted the following areas of concern:

- BT's adjustments to its local end components' costs and volumes; and
- scrutiny of BT's volume figures.

BT's adjustments to its local end components' costs and volumes

F.20 The local end volumes published in the Regulatory Financial Statements reflect the number of instances of local end equipment by bandwidth (i.e. 64kb/s, 2 mb/s, 34mb/s 140mb/s etc) utilised by leased line circuits etc. These volumes along with the associated costs are used as inputs into its model. BT has made a series of adjustments to these costs and volumes with the intention of deriving the cost of supplying a local end for a leased line of a particular bandwidth.

F.21 BT has made an adjustment to reflect the fact that circuits of a certain bandwidth may terminate on local end equipment of a different bandwidth (e.g 64kb/s circuits terminating on 2mb/s equipment). However, this adjustment is only made for 64kb/s and n*64kb/s circuits terminating on 2mb/s equipment. Ofcom feels that it is inconsistent to apply this adjustment of 64kb/s and n*64kb/s circuits only.

F.22 BT's local end costs and volumes relate to both third party local ends and the POC end. BT makes an assumption about relative costs to calculate the cost of a POC end. The total local end charge for an Altnet is the sum of the third party local end and the POC end. BT claimed that this treatment reflected the fact that the unit cost of such a POC end would on average be lower than the cost of a third party local end due to the higher levels of aggregation.

Ofcom's scrutiny of BT's volume figures

F.23 BT's pricing model converts absolute cost totals into unit costs by dividing total costs by the total associated volumes. These unit costs are a key influence on BT's proposed PPC terminating segments circuit rental and connection charges. Ofcom therefore scrutinised the volume data to understand their appropriateness, and their sensitivity, to the outputs from BT's model.

F.24 The volume measures for BT's trunk and distribution transmission network components were not measured on the same basis as the costs included in its Regulatory Financial Statements. The distinction between reported trunk and distribution costs is based on BT's network layers – the Mesh network tier 1 and MSH costs were included in trunk transmission whilst Mesh network tiers 2, 3 and 4 were included in distribution transmission – while the volume measures reflected the '15 km rule' whereby the first 15km of any leased line circuit, on a radial basis, was deemed to be distribution with the remainder of length of the circuit being deemed trunk. BT acknowledged that this 'rule' would systematically undercount the total route kms of circuits carried over the distribution part of its PPC terminating segments transmission network.

F.25 In the absence of BT being able to provide actual volumes on a consistent basis with the reported costs it provided an estimate of the revised split between trunk and distribution of the combined transmission route lengths.

F.26 Further, the reported local end volumes were calculated using assumptions as to how many local ends the different types of leased line based products had. BT's inland private circuit network component costs (and volumes) not only relate to the costs of providing PPC terminating segments supplied to Altnets but also the aggregate network cost of the leased-line element of all leased-line based products supplied by BT in downstream markets. The suggestion that there may be a disparity between the actual volumes of local ends and the number reported casts some doubt on whether these volumes were reliable.

F.27 BT did make the series of adjustments to costs and volumes as described in outline above. However, BT has not adequately demonstrated to Ofcom that the individual volume adjustments were transparently consistent with each other or that they reflect wholly consistent assumptions as regards the potential for circuits of a particular bandwidth to be terminated on equipment of a higher bandwidth.

BT's PPC profitability analysis

F.28 In addition to review BT's Pricing Model, Ofcom has considered whether there is any evidence that current PPC terminating segments charges either are or have been too low such that BT had not been fully recovering costs. At face value the outputs of BT's Pricing Model would appear to suggest that this is the case. Ofcom considers that this would be reflected in BT's rate of return.

F.29 BT provided a financial schedule[15] for 2002/03 in a form that disclosed the profitability of each individual regulated PPC terminating segments service, rather than these being reflected within overall totals for revenues, costs and mean capital employed for the inland private circuit network component.

F.30 According to this profitability analysis BT disclosed a return on mean capital employed of 39%, 10% and 17% for 2001/02, 2002/03, and 2003/04 (draft results) respectively. It should be noted that these figures include the results for trunk transmission which is not subject to the proposed PPC terminating segments charge control. As discussed above the reported volumes split between trunk and distribution proved inconsistent with the costs. In the absence of a reliable volume split and recalculation of the transfer charge revenues from BT's downstream activities, results for trunk transmission has been included in the overall profitability analysis.

F.31 Based on the above profitability information available Ofcom concludes that there is insufficient evidence to suggest that BT is substantially under-recovering its costs in terms of supplying PPC terminating segments services to its downstream operations and to the Altnets combined over a sustained period.

[15] BT provides privately to the regulator a suite of financial information (AFI) which supplements the published Regulatory Financial Statements. One of these additional financial schedules (#27) is a profitability analysis of its Network Business by individual regulated services.

Conclusion

F.32 Ofcom needs to be satisfied that in making decisions affecting cost-orientated prices it has available robust and reliable data. Given the uncertainties and concerns with BT's pricing model as explained above, a preference for the gradual realignment of relative prices if so required, and profitability information which questions the justification of increased prices, Ofcom cannot currently endorse BT's model or its outputs.

F.33 Ofcom therefore proposes to use current charges as the starting charges for the long term charge control in the absence of persuasive evidence from BT on the robustness of model and evidence demonstrating that BT is under recovering costs in its controlled PPC terminating segments charges.

Annex G
Cost of Capital

Introduction

G.1 Annex E sets out Ofcom's approach to forecasting the values of X for the low and high bandwidth charge control baskets. Ofcom, in calculating its forecast is required to estimate BT's weighted average cost of capital. This annex sets out Ofcom's approach to estimating BT's weighted average cost of capital.

G.2 There are a variety of methods for estimating a firm's weighted average cost of capital (WACC). It is usually calculated as a weighted average of the costs of debt and equity finance.

G.3 The cost of capital can be expressed in real terms (after adjusting for inflation) or nominal terms. It can also be expressed in post or pre-tax terms. A pre-tax cost of capital should be compared with returns calculated on a pre-tax basis and a post-tax cost of capital with post-tax returns.

G.4 Ofcom's chosen approach is to use a pre-tax nominal cost of capital as a basis for setting charge controls. The following sections outline Ofcom's approach and the values of the key variables it has used in estimating BT's cost of capital.

Estimating the Cost of Capital: the Capital Asset Pricing Model (CAPM)

G.5 A number of different asset pricing models exist for calculating the cost of capital. In addition to the CAPM, which measures market risk via a single beta coefficient measured relative to a market portfolio, there are, for example, multifactor models which measure market risk using multiple risk coefficients estimated relative to different factors.

G.6 Ofcom's preferred approach is to use the CAPM. The CAPM has a clear theoretical foundation and its implementation is simple and well established relative to that of to other asset pricing models. This results in the continued wide use of the CAPM by the UK's economic regulators, and its wide use amongst all practitioners.

G.7 Under the CAPM methodology, the cost of equity is built up from three main factors. These are:

- the risk free rate;
- the market equity risk premium; and
- the value of beta for the company in question.

G.8 The relationship between these factors can be summarised by the following formula:

Cost of equity = RFR + (ERP x beta),
where RFR = the risk free rate, ERP = the equity risk premium.

G.9 The risk free rate is simply the expected rate of return on a risk free investment. The equity risk premium is the expected return on equities over and above the risk free rate (that is, it is the expected reward for holding equities compared

with the reward for holding risk free assets). The value of beta reflects the variability of returns of the equity of the company in question compared with the variability of returns on the equity market represented by an index.

G.10 Similarly, the cost of debt can be expressed as:
Cost of debt = RFR + Debt premium,
where the debt premium is the company specific risk premium for corporate debt above the risk free rate.

G.11 The WACC takes account of the cost of equity and the cost of debt by weighting each of these by the proportion of equity and debt respectively in a company's financial structures in the following way:

WACC = (Cost of equity x (1 – Gearing)) + Cost of debt x Gearing,
where Gearing = Debt / (Debt + Equity).

G.12 The following sections discuss each of these major components in turn.

Risk Free Rate

G.13 The risk free rate of interest is an input into the calculation of both the cost of debt and the cost of equity. For an investment to be truly free of risk, the risk of default needs to be zero, and additionally there must be no reinvestment risk. The first condition can be approximately satisfied by using the yields on UK government debt, where the risk of default can be taken to be negligible. Strictly speaking, to satisfy the second condition, risk free rates should be estimated based on a series of short run risk free investments. This second condition is difficult to satisfy in practice, meaning that the nominal risk free rate is usually proxied by the yield on fixed term government debt of certain maturity. There is a range of maturities on government debt that could be used as the basis for an estimate of the risk free rate. These maturities range from less than 1 year to over 30 years.

G.14 There are arguments in favour of both short and long-term gilts as the best estimate of the risk free rate for the purposes of the proposed charge control. For example:

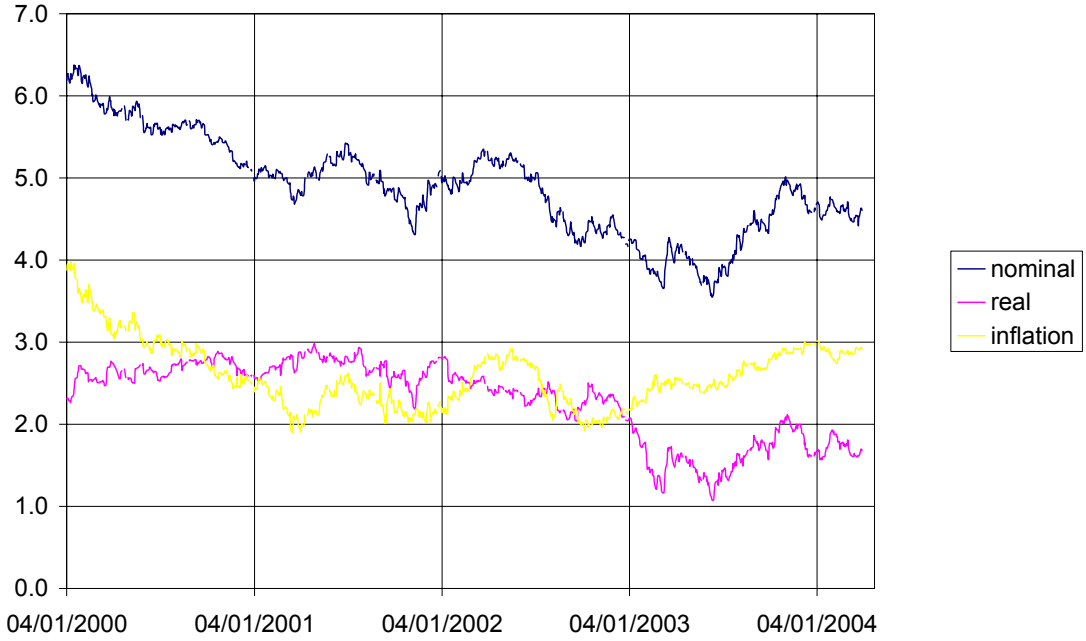
- a maturity of 4 years may be appropriate, as the review is concerned with charge controls to be applied over a 4-year period; and
- BT is required to make investments (for example regarding network infrastructure) that will have economic lifetimes in excess of a 4 year period, and hence a longer term gilt may be appropriate.

G.15 On balance, Ofcom's view is that weight should be given to a number of considerations, and that the use of 5-year gilts to be a reasonable compromise between the above two arguments. The gilt curve is currently relatively flat, meaning that using the yield on longer term gilts would produce only marginally higher estimates.

G.16 Ofcom uses current estimates of yields on nominal gilts as a proxy for the risk free rate. The objective is to obtain a forward-looking estimate of the risk free rate. The nominal risk free rate for 5-year gilts in January-April 2004 ranged

from 4.5% to 4.9%[16], with an average of 4.65%. This rate compares with a real rate of return of 1.8% for similar term index-linked gilts. This difference between the real and nominal rate implies an inflation rate of approximately 2.8%. The implied inflation rate is calculated on a geometric basis: (1+nominal rate)/(1+real rate) –1. The changing nominal rate since the beginning of 2000, together with inflation and real gilt rates calculated by the Bank of England are shown in the Figure G1 below.

Figure G1 – UK Nominal spot rate, Jan 2000-Q1 2004



Source: Bank of England

G.17 There are arguments to suggest that using interest rates calculated based on current returns on government securities may provide an inappropriate benchmark for a risk free investment in the WACC calculation. For example, it could be argued that interest rates calculated from government securities currently provide too low a benchmark for a risk free investment due to factors such as, notably, recent strong demand from pension funds. This might suggest that the risk free rate should be calculated with reference to redemption yields over a longer period of time as well as current spot rates. Such techniques tend to give rise to slightly higher estimates than those based on current returns (as described in, for example, the Competition Commission's report on mobile termination, http://www.competition-commission.org.uk/rep_pub/reports/2003/475mobilephones.htm#full. With this in mind, Ofcom has decided to round up the above average figure of 4.65% to 4.75%. The use of this value reflects any ambiguity as to the appropriate bond maturity to use (e.g. it might be argued that longer values than 5 years would be appropriate).

Equity Risk Premium

Introduction

[16] Source: Bank of England, http://www.bankofengland.co.uk/statistics/yieldcurve/

G.18 The equity risk premium is the difference between the overall return on equities and the nominal risk free rate. Its value in the UK reflects the risk of investing in UK equities generally. There is considerable debate about the appropriate method of estimating the value of the equity risk premium, this estimation being problematic because different methods produce different values. In particular, methods based on an analysis of current market expectations tend to give lower values than those based on analysis of historical estimates from stock market data. But determining current market expectation is a difficult and controversial task.

G.19 The UK's economic regulators and competition authorities have adopted a range of measures of the ERP in recent years. Some examples are given below:

- OFWAT, in Final Determinations: Future water and sewerage charges 2000-05 25 November 1999[17], assumes an equity risk premium of 3.0%–4.0%, based primarily on survey forecast evidence;
- The CAA, in Economic Regulation of BAA London Airports (Heathrow, Gatwick and Stansted) 2003 – 2008, February 2003, decided to use the then-recent Competition Commission range of 2.5% to 4.5%;
- In its report on calls to mobile in December 2002, the CC estimated a nominal range of 2.6%-4.6%. However, in paragraph 7.265 of its report, the CC noted that the extent of uncertainty concerning the downward trend in recent years made a degree of caution appropriate when implementing this decline, in part to help prevent volatility in the short term. It felt that this factor was most appropriately taken account of not by modifying their judgement of the range for the equity risk premium but by increasing the overall level of the WACC by 0.25% in real terms; and
- Ofgem, in its Electricity Distribution Charge control Review, March 2004[18], assumes a range for the equity risk premium with a midpoint of 3.5

G.20 As stated above, estimating the equity risk premium based on historical data typically leads to higher values. Historical estimates is that they can vary markedly depending on the period used – this is shown in the table below, based on research by Dimson, Marsh, and Staunton.

Table G1 – UK mean equity risk premiums over various periods (geometric mean, relative to risk-free rate ("bills"))

Period	Geometric mean	Arithmetic mean
1900 to 1949	2.1	
1900 to 2000	4.8	6.5
1990 to 2000	0.4	
1900 to 2001	4.5	6.2
1900 to 2002	4.2	5.9

Source: Triumph of Optimists, Dimson, Marsh and Staunton, Princeton University Press, 2002 and subsequent updates

[17] http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsbyTitle/finaldets99part11.pdf/$File/finaldets99part11.pdf

[18] http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/6579_COST%20OF%20CAPITAL%20Final.pdf

G.21 The differences shown in this table reflect the wide range of factors that impact bond and stock returns, for example bond returns from 1990 to 2000 were relatively high given the movements of inflation and interest rates over this period.

G.22 It should be noted that the authors of this report provide estimates of "expected risk premiums" that are lower than the unadjusted historical premia, e.g. in a recent update[19] they argue that,

a plausible, forward-looking risk premium for the world's major markets would be on the order of 3% on a geometric mean basis, while the corresponding arithmetic mean risk premium would be around 5%.

Conclusions

G.23 In deciding the appropriate value for the equity risk premium, Ofcom has taken into account a range of evidence, both historical and forward-looking. This judgement reflects its recognition of the need to balance both short and long term interests of consumers. A low rate of return on capital can bring benefits to consumers in the short term in the form of lower prices. However, it could damage consumer's longer term interests. The telecommunications industry depends on high levels of discretionary investment to support innovation and rapid market growth. The funds for such investment are often internationally mobile. Too low a figure for the cost of capital could deter such investment, thus disadvantaging consumers in the longer term.

G.24 Ofcom's current view is that 5% is an appropriate value for the ERP. A wide range of new evidence from academia has been forthcoming in the last two years. The current view of Ofcom's academic adviser, Professor Julian Franks of the LBS, is that the Ofcom should, during this consultation review the use of this estimate in the light of the evidence that has recently been made available. Ofcom is therefore very interested in any views that respondents may have on an appropriate value for this parameter.

Equity Beta

Introduction

G.25 The value of a company's equity beta measures the movements in returns (as measured by the sum of dividends and capital appreciation) from its shares relative to the movement in the return from the equity market as a whole. It increases with a company's debt to equity ratio (gearing), since a higher level of gearing implies higher volatility in the returns to shareholders. Equity beta values for a company are typically calculated by regressing its returns against those of an appropriate market index.

G.26 Beta estimation can be a difficult exercise. There are a number of potentially contentious issues involved in beta estimation. Two significant ones are:
choice of data frequency (daily , weekly, or monthly); and
estimation period (how many years' worth of data to use, and which period to choose).

[19] http://wehner.tamu.edu/finc.www/finc-cuny/equity%20premium.pdf

G.27 The choice between these two methods can have a very significant impact on beta estimation.

G.28 Beta estimation is further complicated by, inter alia, the following issues:

- isolating relevant activities, ie calculating a beta that will relate to the activity covered by the proposed charge control, but also any other activities to which WACC estimates based on this beta will be applied (eg future competition cases) ; and
- the need to measure risk relative to an appropriate index (i.e. regressing BT's returns against either a domestic or international market index).

G.29 Ofcom's current view on each of the key issues identified above is outlined below.

Data frequency

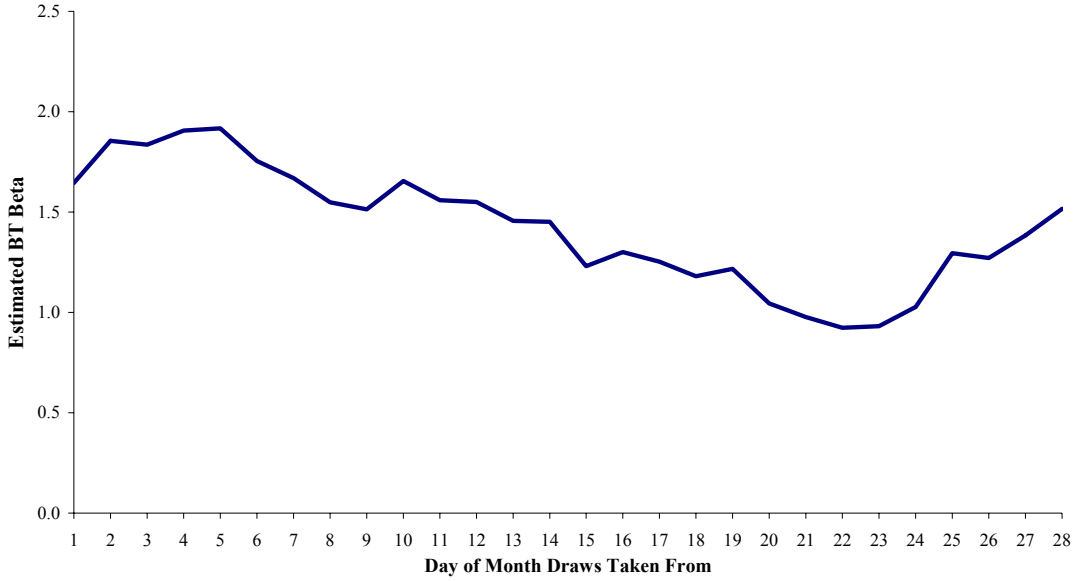
G.30 A key issue in beta estimation is the choice of daily or monthly (or indeed weekly) returns. The relative merits of these estimation techniques are summarised in the Competition Commission's 2003 report on mobile call termination[20], and discussed at some length in a paper written by The Brattle Group on behalf of Oftel, Issues in Beta Estimation for UK Mobile Operators, The Brattle Group, July 2002.

G.31 Advantages of using daily data in beta estimation include:

- obtaining greater statistical accuracy (shown by lower standard errors); and
- the fact that beta estimates based on monthly returns are often sensitive to the day of the month on which data points are taken (eg see the Figure G2 below, in which beta estimates fluctuate widely across values in the interval of 1 and 2 depending on which day of the month is used)

[20] http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctm_2003/index.htm

Figure G2 - Beta calculated from 5 years of Monthly Data, Jan 1999 - December 2003



Source: The Brattle Group

G.32 Disadvantages of using daily data in beta estimation include:

- statistical problems that may result from using daily data, notably "non synchronous trading bias" (see the Brattle Group's 2002 paper for details). However, these problems can be mitigated by the use of statistical corrections, eg a "Dimson adjustment"; and
- the fact there is no widely recognised published source of beta estimates using daily data (such as the LBS RMS beta which is based on monthly data).

G.33 Given the degree of uncertainty involved (caused, for example, by being unable to precisely isolate the relevant components of BT's overall activities, and ensuing difficulties in interpreting statistical tests), a degree of judgement is involved. Ofcom's view is therefore that a prudent approach is to place a degree of weight on all estimation methods, subject to statistical robustness of estimates. The most appropriate estimation method will very much be dependent on the statistical properties of the data set used, and may depend (see below) on the data window used – in cases where a short data window is appropriate, the use of monthly data will not be appropriate, since there will be insufficient data points available for calculating robust estimates.

Data window

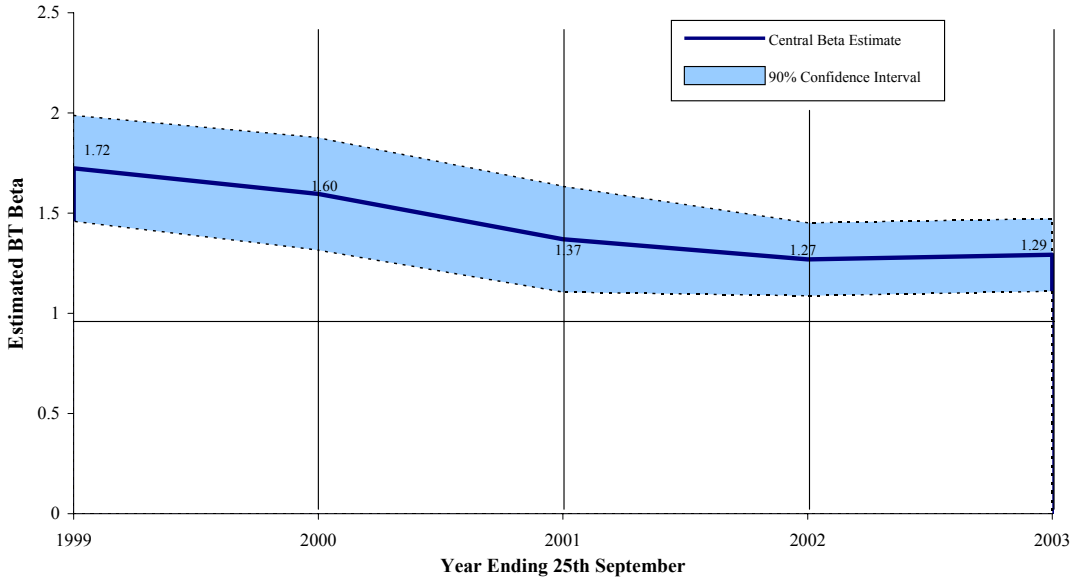
G.34 An issue closely related to that of data frequency is that of the appropriate data window to use for estimation. For example, the published LBS RMS beta estimates are based on 5 years of monthly data, whereas, using data of a higher frequency, it is perfectly possible to estimate betas based on a single year's worth of data or less.

G.35 The trade-off involved in selecting the appropriate data window is between:

- the need to reflect the most recent possible data in order to proxy future values (which favours the use of shorter estimation periods); and
- the desirability of obtaining low standard errors of estimation by including many observations (which favours the use of longer estimation periods).

G.36 Ofcom's view is that, (at least when using daily data) the most appropriate time period to use is, at present, a relatively short window. This is because the beta for BT has emphatically not remained at a roughly constant level in recent years. This is illustrated below.

Figure G3 - 90% Confidence Intervals for Annual BT Beta vs. All Share Daily Data)



Source – The Brattle Group

G.37 Beta estimates for the 12 months up to the end of 2001, 2002, and 2003 are all relatively close together. However, the betas corresponding to earlier periods fall well outside the 90% confidence intervals for the beta calculated for the 12 months up to the end of 2003. These changes are very significant, and may relate to, e.g. changing market sentiment and the changing nature of BT's business such as the sale of its mobile network operation business. Ofcom's view is therefore that, estimates based on data windows going back more than 3 years are, at present, unlikely to be robust. This is confirmed by The Brattle Group, which (based on the results of a series of statistical tests) recommends that, where daily data is used, beta estimates based on the last full year of data. Ofcom's view is that this seems like a reasonable compromise between a sufficiently large sample size and the need to use up-to-date information. It is important to note that future changes in market conditions could mean that the Ofcom might feel it appropriate to use a longer, or perhaps even shorter, data window for beta estimation.

Appropriate index

G.38 Traditional cost of capital analysis has estimated the risk of a stock relative to its domestic market. However, given the increasing prevalence of non-UK investment within the portfolios of UK investors, there are increasingly strong

grounds for estimating risk relative to an international portfolio (see Issues in Beta Estimation for UK Mobile Operators, The Brattle Group, July 2002). Ofcom's view is that some weight should therefore be given to beta estimates measured against international indices in addition to domestic ones.

G.39 A beta estimate for a stock that has been measured against an international index is typically lower than one measured against a domestic index, since returns of the stock will in general be most highly correlated with those of its domestic index. This is reflected in the values in the table below.

Conclusions

G.40 The Brattle Group has carried out an extensive regression analysis on Ofcom's behalf. Details of this are provided in the report alluded to above. This work, together with publicly available estimates, has provided Ofcom with a range of beta estimates. The most significant of these results are shown in the table below.

Table G2 - Equity beta estimates for BT (all at actual gearing levels)

Estimated by/ description	Data Frequency	Index	Period	Estimate (range)
The Brattle Group	Daily	UK	2002-03	1.29
The Brattle Group	Daily (+ Dimson adjustment)	UK	2002-03	1.29
LBS RMS	Monthly	UK	1998-2003	1.51
The Brattle Group	Daily	World	2002-03	0.89

G.41 Ofcom's view is that, in the light of these estimates, an equity beta value of 1.3 at BT's actual gearing level is appropriate. This is based on putting a large amount of weight on a central estimate based on daily (domestic) data, and a smaller amount of weight on published results that have been estimated using monthly data; and on estimates measured against an international index

Debt Premium

G.42 The cost of corporate debt is made up of a risk free component and a company specific risk premium. Historical evidence suggests that blue chip corporate debt, such as that of BT, commands a small risk premium, although estimates of this premium vary considerably.

G.43 Ofcom has looked at the average promised yield on recently issued long term BT debt as of the end of January 2004. The promised yield on such debt varies between about 5.4% and just over 6%. Given the risk free rates described above this would translate into a premium over the risk free rate of approximately 1%.

G.44 In the light of these figures Ofcom's preferred approach is to use a debt premium of 1%.

G.45 Ofcom's estimate of the mobile operators' cost of capital is based on beta of debt of zero for the first one percent of the debt premium and increasing by 0.2

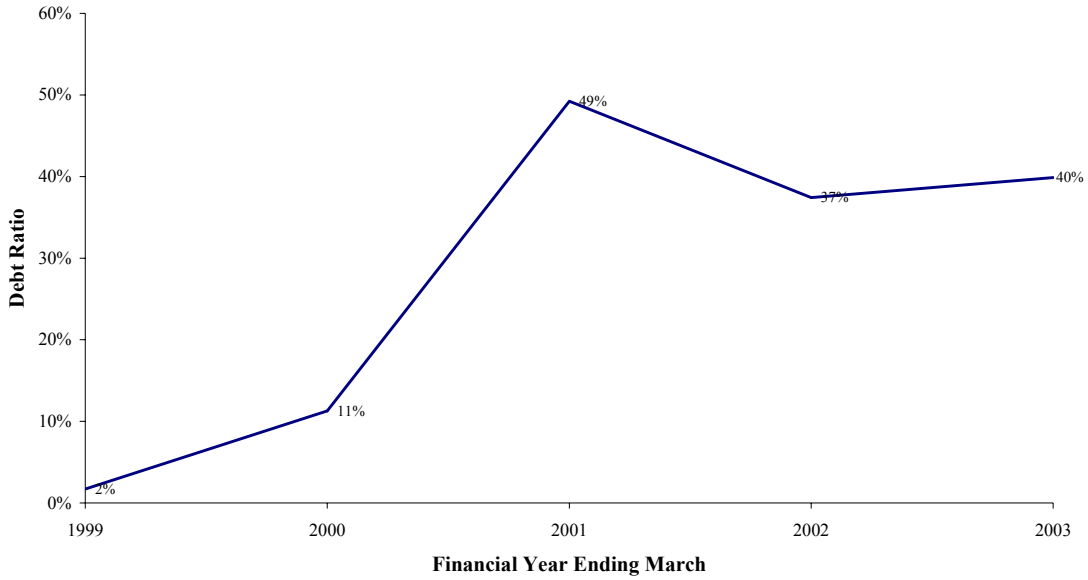
for every one percent of debt premium above one percent. The debt beta measures the riskiness of the returns on debt. Ofcom's estimate of the debt beta implies that the first one percent of premium on BT's debt is due to liquidity risk rather than default risk. Any increase in debt premium beyond that level is attributed to the risk of default.

Optimal gearing

G.46 Under the standard Capital Asset Pricing Model a firm can potentially lower its overall cost of capital by increasing its gearing. This is because debt is generally cheaper than equity as a result of tax advantages to debt.

G.47 The chart below shows how BT's gearing level (measured as the ratio of debt to debt plus equity) has evolved over the last few years.

Figure G4 – BT's gearing ratio, 1999 to 2003



G.48 This figure shows that BT's gearing ratio at the end of the most recent financial year was 40%. However, lower values can be calculated using updated information on share prices (which have been above March 2003 levels in recent months) and BT's debt levels from its Q2 and Q3 2003/04 financial reports.

G.49 Additionally, there are arguments to suggest that this gearing ratio may be above the optimal level. Notably, BT has stated an intention to lower its current levels of debt (£8.8bn in Q2 2002/03) to bring it closer to an optimal level (eg £7bn by 2006/07 – see www.btplc.com/Investorcentre/Financialperformance/Presentations/q203slides.ppt). With these factors in mind, Ofcom's view is that putting equal weight on gearing ratios of 35% (calculated using the most recent available information on BT's value of debt and equity) and 30% (calculated by assuming the current value of equity but BT's target level of debt).

Effective Corporate Tax Rate

G.50 The calculations set out above are on a post tax basis. Ofcom financial models calculate pre tax returns, so it is necessary to convert the post tax cost of capital into an equivalent pre tax figure. This is achieved by dividing the post tax figure by a factor of (l-tc), where tc is the effective corporate tax rate. Ofcom

has assumed, as is standard practice in the UK (eg the CC has used this methodology in its recent reports), that BT's effective tax rate is the current standard rate of corporate tax of 30%.

Conclusion

G.51 Overall, using a broad range of parameters, Ofcom estimates the pre-tax nominal cost of capital for BT to be between 12.46% and 12.58%. The higher end of this range corresponds to a scenario in which BT's gearing is lower that is currently the case, meaning that a lower weight is placed on the cost of equity. This is illustrated in the table below.

Table G3 - Estimates of pre-tax nominal WACC

	Current gearing	Future gearing
	35%	30%
Risk-free rate	4.75	4.75
ERP	5.00	5.00
Equity beta	1.30	1.22
Cost of equity (post tax)	11.25	10.86
Debt premium	1.00	1.00
Cost of debt (pre tax)	5.75	5.75
Corporate tax rate	30%	30%
Cost of debt (post tax)	4.03	4.03
Gearing	35%	30%
WACC (post tax)	8.72%	8.81%
WACC (pre tax)	12.46%	12.58%

G.52 The midpoint of this range is 12.5%. This is equivalent to a real cost of capital (assuming an inflation rate of 2.8%) of 9.4%, using the equation (where i represents the annual rate of inflation):

$$WACC_{real} = \frac{1 + WACC_{nominal}}{1 + i} - 1$$

Annex H

NERA REPORT EXECUTIVE SUMMARY

H.1 This report compares the cost efficiency of BT's network with that of the US LECs. The US LECs were chosen as comparators because a significant amount of detailed cost data is available for these operators, and because the better-performing LECs are generally regarded as providing the international benchmark for efficiency.

H.2 The study uses data for the US LECs for the years 1996 to 2001[21] to model the determinants of total network costs. Based on this model, the study then makes use of accounting and other data produced by BT, to assess BT's comparative efficiency in 2000/01 to 2001/02.

H.3 There are a variety of statistical and mathematical programming methods that can be used to assess comparative efficiency, each of which has strengths and weaknesses. As a result, NERA considers it appropriate not to rely on any one technique when making such comparisons. If more than one technique is used, the different results can then be reviewed in the light of the relative strengths and weaknesses of the different methods in order to provide a more informed view of comparative efficiency.

H.4 The techniques used in this study are:

- Multi-year SFA (estimated using LEC data for 1996-2001);
- Multi-year least squares (estimated using LEC data 1996-2001);
- Single-year OLS (estimated using LEC data for 2001);
- Single-year SFA (estimated using LEC data for 2001); and
- Single-year DEA (estimated using LEC and BT data for 2001)[22].

H.5 This report expands and develops the comparative efficiency analysis which NERA has previously carried out for Oftel. The previous comparative efficiency study of BT, completed in 2000, estimated that BT's network activities in 1999/00 were in the region of 3% less efficient than those of the best performing US operators.

H.6 The results of the comparative efficiency analysis completed during this study are presented in the table below. These results suggest that BT has become more inefficient since 1999/00.

[21] Extensive data on the US LECs is published by the Federal Communications Commission (FCC).

[22] BT data is not included in the regression analysis (SFA, Multi-year least squares and OLS) because of the possibility of this introducing bias into the results. BT's efficiency result is then estimated using the regression coefficients produced by the LEC data. Excluding BT from the DEA analysis is not possible, nor does the same problem of potential bias exist for this mathematical programming technique.

Table H1 Summary of BT's comparative efficiency

	Full sample		Large LECs only	
Point of comparison	Best performer	Upper decile	Best performer	Upper decile
Multi-year SFA	n.a.	n.a.	16%	9%
Multi-year least squares	n.a.	n.a.	16%	10%
Single-year OLS	20%	9%	7%	3%
Single-year SFA - Exponential	1%	1%	n.a.	n.a.
Single-year DEA(compared against peer group)	17%	n.a.	13%	n.a.
Range of All Results	1%-20%	1%-9%	7%-16%	3%-10%
Range Excluding Single-year Regressions	17%	n.a.	13%-16%	9%-10%

Source: NERA Analysis

H.7 Analysis was completed, where possible, using both the full sample of US LECs and using the large LECs only (those with over 1 million exchange lines). It was not possible to estimate the multi-year regressions with the full sample of US LECs as tests identified that, over the period 1996 to 2001 as a whole, there were structural differences between the total cost functions of the large and small LECs. However, comparable tests using data just for 2001 indicated that these structural breaks were not present in that year. Therefore it was possible to estimate the single-year regressions using both the full and large LEC only samples.

H.8 There are no results for the single-year SFA (large LECs only) model as there was insufficient data for this technique to estimate inefficiency scores for this regression. Indeed, there were significant problems in obtaining inefficiency scores for the single-year SFA (full LEC sample) regression. Of the three distributional assumptions that can be used to estimate single-year SFA regressions, it was only the exponential distribution which was able to identify inefficiency scores.

H.9 The results of all the single-year techniques should be treated with some caution as these regressions were estimated using relatively small samples. The single-year OLS (large LECs only) is based on a sample size of 29 and the single-year SFA and single-year OLS (full LEC sample) are based on a sample size of 46. In contrast, the multi-year regressions are both based on a sample of 174. Hence, the results of the single-year regressions should be considered to be less reliable than those estimated using the multi-year techniques.

H.10 Given the greater robustness of the results of the multi-year analysis, and the broad consistency between the results of the multi-year analysis and the DEA analysis using the large LECs only sample, it was concluded that BT's inefficiency is in the region of 9% to 10% compared to the upper decile point of the large LECs and of 13% to 16% compared to the best performing large LECs.[23]

[23] The results of the single-year OLS are not included in the range as the very limited sample size used to estimate this regression may have limited the robustness of these results.

H.11 The results discussed above are those estimated using the NERA model specification. BT suggested an alternative model specification, which yields a much higher value for the loglikelihood function, implying that it fits the data better. Additionally, the BT model produces significantly different efficiency results. Using the multi-year SFA technique BT's inefficiency compared to the upper decile is 1% under the BT model compared to 9% under the NERA model.

H.12 NERA assessed the suitability of the two alternative model specifications using a number of criteria (see section 5.4 for a discussion of this analysis). The aim of this assessment was to identify the model which is most appropriate for assessing BT's comparative efficiency for the purposes of Ofcom's price cap modelling. The assessment indicated that the NERA model is more appropriate for assessing BT's comparative efficiency for the purposes of deriving an efficiency factor for inclusion in a price cap model. The main reasons for this are that the NERA model is more consistent with BT's regulatory cost base, the results of the NERA model are consistent with analysis of the relative movements over time in the costs and outputs of BT and the US LECs and the NERA model allows for a comparison of how BT's efficiency has changed since the previous comparative efficiency study completed in 2000.

H.13 The results of the NERA model imply a significant deterioration in the performance of BT since 1999/00. To assess the validity of this conclusion we investigated how the change in BT's costs relative to output compared with that for the US LECs. The table below shows how BT's network costs, total lines and call minutes changed between 1999/00 and 2001/02 and compares these changes to the average change for the US LECs.

Table H2 - Analysis of cost and output changes 1999/00 to 2001/02

	Percentage change in network costs	Percentage change in total line numbers	Percentage change in call minutes
BT	19%	2%	40%
Average of US LECs	0%	11%[24]	-1%

H.14 It can be seen that, while BT's network costs increased by 19% over this period, the LECs' costs, on average, remained more or less constant. Whilst BT's call minutes increased significantly faster than the LECs' call minutes between 1999/00 and 2001/02, its line numbers increased more slowly than those of the LECs. If we assume that lines account for 70% of total network costs and calls for 30% (which was the case for BT in 2001/02), then, between 1999/00 and 2001/02, BT experienced a 19% increase in costs in the face of a 13.4% increase in output while the LECs experienced no increase in costs while their output grew by 7.4%. In other words, BT costs grew faster than its output while the opposite was true for the LECs.

H.15 These figures support the view that BT has become less efficient since the previous comparative efficiency assessment carried out in 2000 (using data for the financial year 1999/00). In fact they suggest that BT's inefficiency could have increased by something in the region of 13 percentage points since 1999/00. The difference between BT's inefficiency in the previous study

[24] A significant driver of the increase in the number of total lines for the US LECs is the growth in the number of leased lines.

(approximately 3%) and the range for BT's inefficiency identified by the NERA model in this study, of between 9% and 10% relative to the upper deciles, is around 7 percentage points. The conclusion therefore is that the efficiency decline implied by the NERA model is broadly consistent with the pattern of changes in costs and output volumes over time.

H.16 To assess further the validity of this finding, the percentage change in BT's output(s) over the period, along with the coefficients on these variables in the final NERA regression, were used to estimate more formally the change in network costs that would be expected as a result of the change in outputs.

H.17 Given the functional form of the regression model estimated, each of the regression coefficients can be interpreted as the expected percentage change in costs that would occur if the variable concerned were to change by 1%. For example, the coefficient on total lines, which was estimated as 0.81 in the multi-year SFA regression, indicates that if total lines were to increase by 1%, total costs would be expected to increase by 0.82%. The coefficients on switch minutes, of 0.15, and all other variables can be treated in a similar way.

H.18 This analysis indicated that the changes in BT's outputs over the period 1999/00 to 2001/02 would suggest a 9% increase in BT's total network costs. As shown above, BT's actual network costs increased by 19% between 1999/00 and 2001/02. Therefore, the results of this more formal estimation of the expected changed in BT's network costs supports the conclusion that BT's efficiency has deteriorated over the period 1999/00 to 2001/02.

H.19 The conclusions reached above suggest that BT's inefficiency could have increased by something in the region of 10 to 13 percentage points since 1999/00. This magnitude of efficiency change is consistent with BT's inefficiency score increasing from 3% in 1999/00 to between 9% and 10%, when compared to the upper decile point of the large LECs, and between 13% and 16% when compared to the best performing large LECs.

H.20 Reflecting this, it is reasonable to conclude that, for the purposes of Ofcom's price cap modelling, BTs inefficiency score in 2001 is:

- between 9% and 10% when compared with the upper decile point of the large US LECs, and
- between 13% and 16% based on the more demanding comparison against the best performance (i.e. the most efficient large US LEC).

Annex I

Glossary

Accumulated (HCA) depreciation - Totality of deductions made to the original purchase price of a tangible fixed asset to reflect its cumulative consumption since acquisition.

Accumulated (CCA) depreciation - Totality of deductions made to the gross replacement cost of a tangible fixed asset to reflect its cumulative consumption since acquisition.

Add Drop multiplexor (ADM or mux) – multiplexor equipment enabling the removal or addition of bit-streams from larger assemblies.

Asymmetric Digital Subscriber Line (ADSL) (also known as xDSL) – a technology that allows the use of a copper line to send a large quantity of data (eg a television picture) in one direction and a small quantity (eg a control channel and a telephone call) in the other.

Annex II (of the ICD) – Annex II operators are those who have rights and obligations to interconnect with each other under Article 4(1) of the Interconnection Directive for the purpose of providing publicly available telecommunication services. Also known as a Schedule 2 Public Operator in BT's licence.

Bandwidth – the physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz) and in digital systems in binary bits per second (Bit/s).

Book life - The period over which the entity expects to derive economic benefit from that asset.

Capital expenditure - Spending on assets that have physical substance and are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes on a continuing basis in an entity's activities.

CCA (current cost accounting) depreciation - The measure of the cost in terms of its current price of the economic benefits of tangible fixed assets that have been consumed during a period.

Cumulative OCM depreciation – This is the cumulative total of the OCM depreciation.

Customer Sited Handover (CSH) – interconnection occurs at an OLO's premises.

Customer Premises Equipment (CPE) – sometimes referred to as customer apparatus or consumer equipment, being equipment on consumers' premises which is not part of the public telecommunications network and which is directly or indirectly attached to it.

Digital Cross Connection node (DCCN) – a node in BT's Private Circuit network where circuits at 64kbit/s and below can be cross-connected between differing 2Mbit/s tributaries.

Digital Junction Switching Unit (DJSU) – a tandem switch used to connect between DLEs in the London area.

DLE (Digital Local Exchange) – the telephone exchange to which customers are connected, usually via a concentrator.

DMSU (Digital Main Switching Unit) – connects calls between DLEs and also other DMSUs and form the backbone of the trunk network.

Effective life - the remaining life of the assets to the common expiry date.

Financial capability maintenance - The maintenance of an entity's financial capability (i.e. the amount of the shareholders' equity interest) when determining the profitability of an entity

Frame Relay service – a packet switched data service providing for the interconnection of Local Area Networks and access to host computers at up to 2 Mbit/s.

Gross book value - the original purchase price of a tangible fixed asset.
Gross replacement cost - The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity.

HCA (historical cost accounting) depreciation - The measure of the cost in terms of its original purchase price of the economic benefits of tangible fixed assets that have been consumed during a period. Consumption includes the wearing out, using up or other reduction in the useful economic life of a tangible fixed asset whether arising from use, effluxion of time or obsolescence through either changes in technology or demand for the goods and services produced by the asset.

In Span Handover (ISH) – interconnection occurs at a point between BT's premises and an OLO's premises.

Leased line – a permanently connected communications link between two premises dedicated to the customers' exclusive use.

Local End Fixed Charge - This is a flat rate charge depending on the bandwidth of the Local End but the costs of the Local End are averaged for each bandwidth so this charge is independent of the type of Local End infrastructure deployed.

Main Link Fixed Charge - This is a flat rate charge for PPCs with a Main Link and has no distance related element but is dependant on the bandwidth of the PPC.

Main Link Fixed Charge - This is a flat rate charge for PPCs with a Main Link and has no distance related element but is dependant on the bandwidth of the PPC.

Main Link per Kilometre Charge - This is a charge per kilometre for the Main Link and again this varies by bandwidth.

PPC connection charge – This is the charge levied to recover the costs incurred by BT in provisioning the PPC.

PPC rental and maintenance charges – These are the charges levied by BT for the ongoing rental and maintenance of the PPC. The PPC rental has three main components; a Local End Fixed Charge, a Main Link Fixed Charge and a Main Link per kilometre Charge.

Mbit/s – mega bits per second. A measure of speed of transfer of digital information.

MSH – Marconi Synchronous Hierarchy (also known as Marconi Broadband Overlay Network). Similar to SDH method of transmission but at higher bandwidths (155Mbit/s to 2.4Gbit/s).

Net current assets - Total current assets less current liabilities.

Net replacement cost - Gross replacement cost less accumulated depreciation based on gross replacement cost. An alternative is Depreciated replacement cost (of tangible fixed assets other than property:-The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity, from which appropriate deductions are made to reflect the value attributable to the remaining portion of the total useful economic life of the asset and the residual value at the end of the asset's useful economic life.

OCM depreciation – This is the sum of CCA depreciation and HCA depreciation.

Operating capability maintenance - The maintenance of an entity's operational capability (i.e. the capacity to produce goods and services) when determining the profitability of an entity

Operating expenditure - Costs reflected in the profit and loss account excluding depreciation financing costs such as interest charges.

PPC – A generic term used to describe a category of private circuits that terminate at a point of connection between two operators' networks. It is therefore the provision of transparent transmission capacity between a customer's premises and a point of connection between the two operators' networks. It may also be termed a part leased line. It includes terminating segments.

Plesiochronous Digital Hierarchy (PDH) – an older method of digital transmission used before SDH which requires each stream to be multiplexed or demultiplexed at each network layer and does not allow for the addition or removal of individual streams from larger assemblies.

PC POC (Private Circuit Point of Connection) – BT's Link to a Point of Interconnection product. This is a private circuit from a customer's premises to point of interconnection between BT and another operator's network. It is only available at 2Mbit/s to be purchased by PTOs.

Points of Connection (POC) – also known as a Switch Connections ie where an operator's network interconnects with BT usually at a Digital Main Switching Unit (DMSU) or Wide Area Tandem (WAT).

RCU (Remote Concentrator Unit) – the lowest level of BT's PSTN hierarchy. Customer lines, which are generally copper wires, are concentrated/multiplexed and routed to a DLE.

Supplementary depreciation - The additional depreciation charge to convert an HCA depreciation charge into a CCA depreciation charge.

Synchronous Digital Hierarchy (SDH) – a method of digital transmission where transmission streams are packed in such a way to allow simple multiplexing and demultiplexing and the addition or removal of individual streams from larger assemblies.

Synchronous Transport Module (STM) – transmission of bit-streams at either 155 Mbit/s, 622Mbit/s or 2.4 Gbit/s.

Terminating segment – a terminating segment is capacity between a customer's premises and a point of connection between two networks at the DMSU level.

Tributary cards – a tributary card sits in a multiplexor receiving a tributary enabling the multiplexor to combine inputs from each of the tributary cards in the multiplexor. For example, in an SMA-4 multiplexor, there can be up to 4 STM-1 tributaries connected via tributary cards. The multiplexor combines the 4 STM-1 tributaries into an STM-4 transmission bit stream.

Weighted book life - The average asset life of a particular network component's mix of tangible fixed assets determined by weighting each asset category's life by the gross book value.

Wide Area Tandem (WAT) – a tandem exchange used to connect calls between DLEs over a wide area.